

**Mindfulness meditation and the  
clinically modified Buddhist  
psychological model in psoriasis**

**Alan Maddock**

**PhD  
University of Dublin,  
Trinity College  
2019**

## **Declaration**

I hereby declare that:

- (a) the work contained in this thesis has not been submitted as an exercise for a degree at this or any other university,
- (b) this thesis is the result of my own investigations, and their contributions of others are duly acknowledged in the text wherever included,
- (c) I give permission to the library to lend or copy this thesis on request.

Signed: \_\_\_\_\_  
Alan Maddock

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

## **Acknowledgements**

I would like to acknowledge and thank the SPHeRE scholarship programme team and the Irish Research Board for funding and supporting this research.

Thanks to Dr. Paul D’Alton and Professor Brian Kirby of St. Vincent’s University Hospital, Dublin for their support with this research over the last 3 years. I am also very appreciative of the participants in this project who voluntarily gave their time.

Within the School of Psychology over the last 4 years, a special thanks to Prof. Malcolm MacLachlan, Dr. Olive Healy, Dr. Mary Creaner and Dr. Clare Kelly, for their appraisal of this research.

On a personal note, a huge thank you to my girlfriend Eleanor who has been hugely supportive on this PhD journey. I would like to thank my SPHeRE scholar classmates for their friendship and support through my 4 years on the programme. To Siobhan, we will always miss you but never forget you. A huge thank you to my parents, Eileen and Pat, for their continuous encouragement and support.

Finally, the biggest thank you to my supervisor, Prof. David Hevey, for his guidance, good-humour and constant support for which I am hugely appreciative of.

## **Table of Contents**

---

<b>DECLARATION</b>	<b>II</b>
<b>ACKNOWLEDGEMENTS</b>	<b>III</b>
<b>TABLE OF CONTENTS</b>	<b>IV</b>
<b>LIST OF TABLES</b>	<b>XI</b>
<b>LIST OF FIGURES</b>	<b>XII</b>
<b>GLOSSARY OF TERMS</b>	<b>XIV</b>
<b>CHAPTER 1: Introduction: Psoriasis</b>	
1.1 Psoriasis	1
1.1.1 Epidemiology and prevalence	1
1.1.2 Patterns of psoriasis	2
1.2 Role of stress in psoriasis	4
1.2.1 Negative health/avoidant stress coping behaviours	7
1.3 Consequences of having psoriasis	7
1.3.1 Co-morbid conditions	7
1.3.2 Health care treatment and financial costs	8
1.3.3 Psycho-social burden	9
1.3.4 Psychological distress	13
1.4 The stress coping process	17
1.4.1 Transactional theories of stress and coping	19
1.4.2 Appraisal types	22
1.4.3 Secondary appraisal	22
1.4.4 Coping	24
1.4.5 Coping strategies	25
1.4.6 Emotion	26

1.4.7	The functioning of the stress coping process	27
1.4.8	Moos's stress coping theory	28
1.4.9	Approach and avoidant coping	29
1.4.10	Mindful Stress-coping	31
1.4.11	Potential for psychological supports	33
1.5	Summary and conclusions	37

## **CHAPTER 2: Introduction: Mindfulness**

2.1	Mindfulness	39
2.1.1	Mindfulness origins: connections between the east and west	39
2.1.2	Mindfulness-based Cognitive Therapy (MBCT)	42
2.1.3	Mindfulness and psoriasis	45
2.1.4	Cost-effectiveness of MBCT	48
2.2	Issues in mindfulness research thus far	49
2.2.1	Mindfulness – unclear mechanisms of action	50
2.3	Mindfulness mechanisms of action models	53
2.3.1	Buddhist Psychological Model (BPM)	56
2.3.2	Components of mental activity	57
2.3.3	Effects of attention regulation	61
2.3.4	Effects of acceptance, compassion and ethical practices	62
2.3.5	Effects of ethical practices	63
2.4	Research supporting the BPM's conceptualization	63
2.4.1	Omission of ethical practices variable	65
2.4.2	Mindfulness	66
2.4.3	Self-compassion	67
2.4.4	Decreased attachment and aversion	71
2.4.5	Acceptance	73
2.4.6	Concentration/attention regulation	75
2.4.7	Mental proliferation – rumination and worry	78
2.4.8	CBPM domain and mediating variables	84
2.5	Primary outcomes	84
2.5.1	Psychological wellbeing	85
2.5.2	Anxiety and depression (psychological distress)	86
2.6	Aims and objectives	88

### **CHAPTER 3: Individual differences in wellbeing, anxiety and depression in psoriasis patients.**

3.1	Introduction	94
3.1.1	Aims of the current study	94
3.1.2	Research hypotheses	95
3.2	Method	96
3.2.1	Study design	96
3.2.2	Participants	97
3.2.3	Measures	98
3.2.3.1	CBPM outcomes	98
3.2.3.1.1	Wellbeing: Ryff's Psychological Wellbeing Scales	98
3.2.3.1.2	Anxiety and Depression: Hospital Anxiety and Depression Scale	99
3.2.2	CBPM domains	99
3.2.2.1	Acceptance: Philadelphia Mindfulness Scale	99
3.2.2.2	Mindfulness: Southampton Mindfulness Scale	100
3.2.2.3	Attention Regulation: Experiences Questionnaire	101
3.2.2.4	Non-Attachment: Non-Attachment Scale	101
3.2.2.5	Aversion: Acceptance and Action Questionnaire –II	102
3.2.2.6	Self-Compassion: Self-Compassion Scale	102
3.2.2.7	CBPM mediating variables: Mental Proliferation	103
3.2.2.7.1	Rumination: Rumination Reflection Questionnaire	103
3.2.2.7.2	Worry: Penn State Worry Questionnaire	104
3.2.3	Ethics review	104
3.2.4	Analytic approach	105
3.3	Results	110
3.3.1	SEM model fit statistics	113
3.3.2	Significant CBPM direct and mediated effects	114
3.3.3	Model replication	115
3.4	Discussion	116
3.4.1	Model fit	116
3.4.2	Aversion	117
3.4.3	Self-compassion	118
3.4.4	Acceptance	120
3.4.5	Non-attachment	121

3.4.6	Attention regulation and mindfulness	121
3.4.7	Theoretical implications	123
3.4.8	Clinical implications	124
3.4.9	Study limitations	124
3.4.10	Future research	126
3.5	Conclusion	126

**CHAPTER 4: Effects of mindfulness-based cognitive therapy on CBPM domain, mediating and outcome variables: results from a randomized controlled trial with psoriasis patients.**

4.1	Introduction	128
4.1.1	Aims of the current study	129
4.1.2	Research hypotheses	129
4.2	Method	129
4.2.1	Sample	130
4.2.2	Randomisation	131
4.2.3	Procedures	131
4.2.3.1	MBCT intervention	131
4.2.3.2	TAU	132
4.2.4	Measures	132
4.2.4.1	CBPM outcome measures	132
4.2.4.2	Self-reported psoriasis	132
4.2.4.3	CBPM domain and mediating variable measures	134
4.2.5	Sample size	135
4.2.6	Statistical analysis	137
4.3	Results	138
4.3.1	CBPM outcomes	143
4.3.2	CBPM domains	145
4.3.3	CBPM mediating variables	147
4.4	Discussion	148
4.5	Conclusion	160

**CHAPTER 5: MBCT as a clinical intervention with psoriasis patients through the lens of the clinically modified Buddhist Psychological model: a qualitative study.**

5.1	Introduction	161
5.1.1	Study aims	166
5.1.2	Research questions	166
5.2	Method	166
5.2.1	Study Design	166
5.2.2	Participants	166
5.2.3	Qualitative interview procedure	167
5.2.4	Ethics review	168
5.2.5	Data analysis	169
5.3	Results	170
5.4	Discussion	178
5.4.1	Approach coping	179
5.4.1.1	Increased mindfulness	181
5.4.1.2	Improved attention regulation skills	181
5.4.1.3	Reduced attachment and aversion	182
5.4.1.4	Increased capacity for acceptance	183
5.4.1.5	Self-compassion	183
5.4.2	Reduced negative thinking	184
5.4.3	Mental health and wellbeing improvements	185
5.4.3.1	Psoriasis	186
5.4.4	Strengths and contribution of this study	187
5.4.5	Limitations	187
5.4.6	Future Research	190
5.5	Conclusion	190

**CHAPTER 6: A moderated mediation analysis of the differences in CBPM change scores from an RCT on the use of MBCT with psoriasis patients.**

6.1	Introduction	191
6.1.1	Aims of the current study	194
6.1.2	Research hypotheses	194



6.2	Method	194
6.2.1	Study design	194
6.2.2	Controlling for Type I and Type II error	195
6.2.3	Statistical analysis	196
6.3	Results	199
6.3.1	Conditional direct effects	199
6.3.2	Conditional indirect effects	201
6.4	Discussion	204
6.4.1	Conditional direct effects	205
6.4.2	Conditional indirect effects	207
6.4.3	Non-significant effects	209
6.4.4	Clinical and theoretical implications	212
6.4.5	Study strengths and limitations	213
6.4.6	Future research	214
6.5	Conclusion	214

## **CHAPTER 7: General Discussion**

7.1	Summary of PhD chapters	215
7.1.1	Efficacy of MBCT on psoriasis, anxiety, depression and wellbeing	218
7.1.2	Efficacy of MBCT on CBPM domain and mediating variables	221
7.2	CBPM as an integrative theory	222
7.2.1	Aversion	223
7.2.2	Self-compassion	224
7.2.3	Mindfulness	225
7.2.4	Attention regulation	228
7.2.5	Acceptance	229
7.2.6	Non-attachment	230
7.2.7	Depression	231
7.2.8	Refined CBPM models	233
7.3	Contribution to the relevant literatures	234
7.4	Future Research	236
7.5	Implications for practice	237
7.6	Implications for theory	240
7.6.1	Integrative mindfulness models	241

7.6.2	Anxiety and wellbeing	242
7.6.2.1	Focuses on both positive and negative affect	242
7.6.2.2	Cognition, emotion regulation and distress	243
7.6.2.3	CBPM maladaptive response-focused strategies	244
7.6.2.4	CBPM adaptive antecedent-focused regulation strategies	245
7.6.2.5	Theoretical examples of both strategies	247
7.7	Conclusion	248
<b>REFERENCES</b>		249
<b>APPENDIX 1 ETHICAL APPROVAL LETTERS</b>		314
<b>APPENDIX 2 STUDY PROTOCOL FOR CHAPTER 3</b>		316
<b>APPENDIX 3 STUDY PROTOCOL FOR CHAPTERS 4, 5 AND 6</b>		320
<b>APPENDIX 4 CHAPTER 5 INTERVIEW SCHEDULE</b>		324
<b>APPENDIX 5 STUDY MEASURES FOR CHAPTERS 3, 4 AND 6</b>		327
<b>APPENDIX 6 MBCT GROUP - EXAMPLE OF A WEEKLY HANDOUT</b>		339

## **List of Tables**

<b>Table 3-1.</b> Demographics and clinical characteristics of participants who provided data at t1 and those who completed the data at t1 and t2.	110
<b>Table 3-2.</b> Means and standard deviations for the CBPM domain, mediating and outcome variables at t1 for participants who filled in measures at t1 only and at t1 and t2.	112
<b>Table 3-3.</b> SEM model fit statistics.	114
<b>Table 4-1.</b> SAPASI body surface area coverage scores.	133
<b>Table 4-2.</b> Demographic and clinical characteristics.	139
<b>Table 4-3.</b> Means and standard deviations for the RCT groups at baseline, after treatment and 3 months post intervention.	141
<b>Table 5-1.</b> Baseline demographics and clinical characteristics.	170
<b>Table 5-2.</b> Summary of interview themes.	171
<b>Table 6-1.</b> Moderated Mediation Analysis – conditional direct effect.	200
<b>Table 6-2.</b> Moderated Mediation Analysis – conditional indirect effect.	201

## **List of Figures**

<b>Figure 1-1.</b> A general conceptual framework of the stress and coping process.	29
<b>Figure 2-1.</b> Buddhist psychological model.	57
<b>Figure 2-2.</b> BPM moment-to-moment awareness.	58
<b>Figure 2-3.</b> Attachment/aversion to feelings creates mental proliferation.	60
<b>Figure 2-4.</b> The three characteristics.	61
<b>Figure 2-5.</b> Process of mental proliferation being disrupted.	62
<b>Figure 2-6.</b> Model representing the CBPM domain, mediating and outcome variables and their theorised direct and mediated relationships.	65
<b>Figure 3-1.</b> Model representing the direct and mediated effect of the CBPM domains on the outcome variables.	95
<b>Figure 3-2.</b> Model representing the direct effect of the CBPM domains on the mediating and outcome variables.	108
<b>Figure 3-3.</b> Model representing the mediated effect of the CBPM domains on the outcome variables.	108
<b>Figure 3-4.</b> Significant effects of the direct and mediated CBPM.	115
<b>Figure 4-1:</b> Consort Diagram: enrollment and study flow in RCT of MBCT versus TAU.	136
<b>Figure 5-1.</b> Causal connections between the themes derived from the semi-structured interviews.	172

<b>Figure 6-1.</b> Path diagram showing the conditional direct effect of changes in a CBPM domain (x) e.g. self-compassion, on changes in the CBPM outcome (y) e.g. anxiety.	196
<b>Figure 6-2.</b> Path diagram showing a mediation model of indirect effect of x (self-compassion) on y (anxiety) when mediated through m (rumination).	197
<b>Figure 6-3.</b> Path diagram showing an example of one of the CBPM conditional process models.	198
<b>Figure 6-4.</b> Significant moderated mediation conditional indirect effects found.	203
<b>Figure 6-5.</b> Significant moderated mediation conditional direct and indirect effects found.	204
<b>Figure 7-1.</b> Refined CBPM for anxiety.	234
<b>Figure 7-2.</b> Refined CBPM for wellbeing.	234

## **Glossary of Terms**

Acceptance: a process of fully embracing experience in any given moment – welcoming what feelings and thoughts life has presented as they are, with openness, kindness, and curiosity, fully and without defense (Baer, 2003; Hayes et al., 2013; Szabo, Long, & Villatte, 2015; Szekeres & Wertheim, 2014).

Anxiety: is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure. People with anxiety disorders usually have recurring intrusive thoughts or concerns. They may avoid certain situations out of worry. They may also have physical symptoms such as sweating, trembling, dizziness or a rapid heartbeat (American Psychological Association (APA), 2008).

Attachments: generally identified as objects or outcomes that represent important goals, that people believe they must have or achieve to be happy, such as positive experiences or avoidance of negative emotions (Coffey, Hartman, & Fredrickson, 2010; Dalai Lama & Cutler, 1998; Hanh, 1999; McIntosh, 1997).

Attention: a process of focusing conscious awareness, providing heightened sensitivity to a limited range of experience and involves the direct, moment-to-moment knowing of what is happening as it is actually happening (Shapiro et al., 2006; Westen, 1996).

Depression: people with depression may experience a lack of interest and pleasure in daily activities, significant weight loss or gain, insomnia or excessive sleeping, lack of energy, inability to concentrate, feelings of worthlessness or excessive guilt and recurrent thoughts of death or suicide (APA, 2008).

Domain: refers to specific conceptual areas of growth and change in emotional and cognitive development after mindfulness practice (Ryff, 1995).

Mindfulness: ‘The awareness that emerges through paying attention; on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment’ (Kabat-Zinn, 2003, pg. 145).

Rumination: the repetitive and passive thinking about one’s symptoms of depression as well as the causes and consequences of those symptoms, i.e., over-identification with repetitive, non-goal-directed, negative cognitions (Sanders & Lam, 2010; Trapnell & Campbell, 1999; Nolen-Hoeksema, 1991).

Self-compassion: involves feelings of caring and kindness towards oneself in the face of personal suffering and involves the recognition that one’s suffering, failures and inadequacies are part of the human condition (Neff, 2003a, 2003b).

Worry: ‘‘a chain of thoughts and images, negatively affect-laden and relatively uncontrollable; it represents an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes; consequently, worry relates closely to the fear process’ (Borkovec, Robinson, Pruzinsky, & DePree, 1983, pg. 10).

## **Chapter 1 : Introduction: Psoriasis**

This chapter presents a review of the literature on psoriasis and the psychosocial burden that can accompany this condition. The literature in the present chapter is broken up into four main areas. The first area presents an overview of psoriasis, its prevalence worldwide, and the patterns of psoriasis disease expression. The second section outlines the role that stress can play in the life of a psoriasis patient. The third section examines the consequences of having a chronic skin condition such as psoriasis. This section reviews the literature on the co-morbid physical and mental health conditions associated with psoriasis along with the psychosocial burden of this chronic skin disease. The final section presents an overview of psychological stress coping theories relevant to this thesis. This section focuses on how these may apply to how psoriasis patients cope with the psychosocial burden of psoriasis. This section also provides a theoretical framework with which to understand how patients may appraise stressors and what approaches they may use to ameliorate distress. A rationale is presented for the development of mindfulness based coping strategies, and evidence for and against the potential of psychological supports that may improve psoriasis patients' wellbeing, physical and mental health.

### 1.1 Psoriasis

#### 1.1.1 Epidemiology and prevalence

Psoriasis is a chronic, noncommunicable, painful, debilitating and disfiguring autoimmune inflammatory skin disease characterised by an accelerated rate of turnover of the top layer of the skin (Irish Skin Foundation [ISF], 2015; World Health Organisation [WHO], 2017). The reported worldwide prevalence of psoriasis, which varies among different ethnic groups, ranges from between 0.09% to 11.4% (Langley,



Kreuger, & Griffiths, 2005; O’Leary, Creamer, Higgins, & Weinman, 2004; WHO, 2017). Kelly-Sell and Gudjonsson (2017) recently estimated that psoriasis affects 125 million people across the world. The ISF (2015) estimated that 1.6% of the population of Ireland, or some 73,205 people have psoriasis. The ISF (2015) also estimated that there are approximately 6,200 new psoriasis cases diagnosed in Ireland annually. These numbers are likely to increase in the coming years as an upward trend has been identified in the prevalence and incidence of the disease internationally (Fordham, Griffiths, & Bundy, 2013; Fortune, Main, O’Sullivan, & Griffiths, 1997; McDonald, Connolly, & Tobin, 2012). Men and women are equally affected by psoriasis (Menter et al., 2008). The usual age of onset is 20-35 years, with 75% of all cases occurring for the first time before 40 (Kimball, Jacobson, Weiss, Vreeland, & Wu, 2005; Menter et al., 2008). Psoriasis can occur at any age, including childhood (often signifying a more severe clinical course and psychosocial impact) and old age (Kimball et al., 2005; Menter et al., 2008).

### 1.1.2 Patterns of psoriasis

Psoriasis is a condition whereby the skin cell life cycle is shorter than average (21-28 days), at around seven days (Camisa, 2005). Whilst the pathogenesis of psoriasis is not known, there is a general consensus in the literature that the clinical lesions represent the end result of hyper proliferation and abnormal differentiation of the epidermis (Biljan, Laufer, Filaković, Šitum, & Brataljenović, 2009; Camisa, 2005). Most commonly the disease presents as chronic, symmetrical, erythematous, scaling papules and plaques (Langley, Kreuger, & Griffiths, 2005). The clinical manifestation of psoriasis can vary both in the size and the number of psoriasis plaques (ISF, 2015; O’Leary et al., 2004). These plaques can range from some

unsightly, scaling, erythematous plaques on elbows and knees, to extensive (erythrodermic) skin involvement, nail dystrophy, and a particular form of arthritis (ISF, 2015; O’Leary et al., 2004). Although the plaques can affect any part of the skin, they are typically found on the surfaces of the knees, elbows, and scalp (Griffiths & Barker, 2007). Psoriasis is considered to be a single disease entity with several morphologic variants (Kimball et al., 2005). The full range of severity and expression of psoriasis has been identified as being based on 1) certain genetic influences (HLA type and genes), 2) environmental factors (such as trauma, stress and climate), 3) health behaviours (smoking, overeating and alcohol consumption, 4) associated diseases (particularly infections), 5) concomitant medications, and 6) immunologic status of the host (Camisa, 2005; Kimball et al., 2005; Menter et al., 2008; Parisi, Symmons, Griffiths, & Ashcroft, 2013). Among the different types of psoriasis (plaque-type, inverse, eruptive, and pustular) the most common form of psoriasis is plaque psoriasis (accounting for approximately 85-90% of sufferers) (Griffiths & Barker, 2007; ISF, 2015; Kimball et al., 2005). Plaque psoriasis is characterised by well-demarcated, often symmetrically distributed, thickened, red, scaly plaques (Griffiths & Barker, 2007; Kimball et al., 2005). Within the psoriasis population worldwide, 12.4% of patients have been deemed as having severe psoriasis (ISF, 2015). Psoriasis is not a contagious condition and is not usually painful (Langley et al., 2005). Pruritus (sensation of itching) is perhaps the most commonly reported symptom with approximately 67–95% of patients reporting it (Fortune et al., 1997). The severity of psoriasis is rarely static with individuals likely to cycle between differing levels of severity throughout their lifetime (O’Leary et al., 2004; Parisi et al., 2013). Psoriasis can also be characterized by patterns of clearance and recurrence, making prediction and anticipation of the course of the disease troublesome in the

majority of cases (O'Leary et al., 2004). Psoriasis is not currently curable, but is controllable with medication (ISF, 2015).

## 1.2 Role of stress in psoriasis

Psoriasis, which is often defined in the dermatology research literature in physical terms, is also rooted in psychological and social aspects of the patients' life (Tinetti & Fried, 2004). In order to understand how psoriasis patients respond to stress, taking a biopsychosocial perspective, which takes into account the complex interactions between biological, psychological and social factors of a patient's life and the importance of potential causal relationships between each is important (Tinetti & Fried, 2004). Decades of research have suggested that psychological stress can have the potential to regulate the immune response (Chapman & Moynihan, 2009; Morey, Boggero, Scott, & Segerstrom, 2015; Wahl, Moum, & Hanestad, 1999).

Psychological and emotional stress have been consistently implicated by patients as a potential trigger in the onset and exacerbation of and causative or maintaining factor in disease expression (Griffiths & Richards, 2001; ISF, 2015; Jobling & Naldi, 2006; Langley et al., 2005; O'Leary et al., 2004). The academic literature on psoriasis has generally found that between 39% and 88% of people living with psoriasis report that their condition is exacerbated by stress and worries (O'Leary et al., 2004; Richards et al., 2005). Periodic recurrence of psoriasis and apprehension related to anticipation of recurrence has been found to cause emotional stress for psoriasis patients (Hill & Kennedy, 2002). In a study of 208 psoriasis patients, Fortune et al. (1997) found that stress resulting from anticipating other people's reaction to their psoriasis contributed more to the variance in patients' disability in every day life than any other medical or health status variable. In a review of the published literature on the impact of psoriasis

on quality of life from 1993-2005, Kimball et al. (2005) concluded that psoriasis can often be seen as a self-perpetuating problem: psoriasis itself causes stress – especially severe psoriasis – and stress makes psoriasis symptoms more severe. It could therefore be important for people who have psoriasis to learn to manage stress, worry and anxiety effectively (O’Leary et al., 2004). Despite the consistently high proportions of patients attributing increases in their psoriasis symptoms to stress and worry, a cross sectional study carried out by O’Leary et al. (2004) of 141 patients in the UK found that perceived stress was not related to self-rated psoriasis severity (SAPASI; Feldman et al., 1996). Levels of perceived stress were however related to quality of life, depression and anxiety. These results suggest that stress is not related to an increase in symptoms, but an increase in the impact the symptoms have on daily life and wellbeing. It is likely that the findings from Kimball et al. (2005) are more robust than O’Leary et al. (2004), due to the number of studies reviewed by Kimball et al. (2005) and the cross-sectional nature of and the small sample size in the O’Leary et al. (2004) study. However, the inconsistencies in these findings may also indicate a more complex relationship between psoriasis severity and stress than outlined in Kimball et al. (2005).

The Biopsychosocial model highlights the complex interactions of biological, psychological and social factors in illness (Suls & Rothman, 2004). The mechanisms of the relationships between psoriasis, stress, anxiety and depression are not entirely understood. From a biopsychosocial perspective, a plausible explanatory mechanism involves the abnormal activation of the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system (SNS) due to stress (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005). During periods of stress, cortisol levels may increase

100-fold, effectively saturating the main regulators of HPA activity (Jacobson & Sapolsky, 1991). Decreases in the number or function of these regulators may thus result in decreased negative feedback by cortisol, leading to the HPA hyperactivity demonstrated in depressed individuals (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005). HPA hyperactivity appears not only to influence mood in this way, but may also effect changes in psoriasis, by stimulating local cutaneous production of proinflammatory cytokines like IL-6 and IL-11 (Zbytek, Mysliwski, Slominski, Wortsman, Wei, & Mysliwska, 2002). The way in which the HPA axis is affected appears to differ amongst psoriasis patients depending on whether they suffer from depression or anxiety. In those with stress-responsive psoriasis, acute anxiety has been hypothesised as being a cause of the production of inflammatory cytokines without the appropriate release of anti-inflammatory cortisol to mitigate the cutaneous response (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005). Depression and anxiety thus likely contribute to the worsening of inflammatory disorders, like psoriasis, via both HPA axis and SNS hyperactivity (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005). Both demonstrate baseline disruptions in these physiologic systems that contribute to ongoing immunopathology (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005). Additionally, these psoriasis patients with depression and anxiety show increased responsiveness to acute stressors, which further alters immune function and can acutely worsen chronic disorders of inflammation and autoimmunity such as psoriasis (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005). Another possible mechanism which may explain how psoriasis cause depression is through alterations in the metabolism of serotonin. Inflammatory cytokines like IL-6 have also been found to increase the breakdown of serotonin (Wang & Dunn, 1998). Thus, inflammation may also affect mood by

simultaneously decreasing production and increasing degradation of serotonin (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005).

### 1.2.1 Negative health/avoidant stress coping behaviours

Psoriasis patients cope with the difficulties of having the condition in a variety of ways, which can commonly include negative health behaviours such as avoiding being in public, smoking, consuming alcohol and/or overeating (Armstrong, Schupp, Wu & Bebo, 2012; Keyworth et al., 2014). When faced with the challenges of living with psoriasis, cigarettes, alcohol and overeating food can be perceived as stress relievers (Hayes & Koo, 2010). These negative health behaviours have been identified as potential contributors to both psoriasis onset and severity, and the exacerbation of other serious comorbid health conditions associated with psoriasis including heart disease, diabetes and obesity (Keyworth et al., 2014). The stress of dealing with the psychosocial burden of psoriasis coupled with dealing with comorbid conditions may in turn trigger the progression of psoriasis further (Armstrong et al., 2012).

## 1.3 Consequences of having psoriasis

### 1.3.1 Co-morbid conditions

While traditionally viewed exclusively as a skin condition, psoriasis is now recognised as a systematic inflammatory condition associated with a range of related co-morbidities (Coumbe, Pritzker, & Duprez, 2014; ISF, 2015). A number of studies have shown that psoriasis patients have significantly increased rates of inflammatory bowel disease, hypertension, dyslipidemia, diabetes mellitus, obesity, ischemic heart disease, cerebrovascular disease, peripheral vascular disease, metabolic syndrome and stroke when compared with controls (Coumbe et al., 2014; Fu, Lee, & Chi, 2018; ISF,

2015; Kimball et al., 2008; McDonald, Connolly, & Tobin, 2012). Psoriasis is also associated with psoriatic arthritis (PsA). The pathophysiological or genetic association between psoriasis and PsA is considered stronger than that of the other related comorbidities (Strohal et al., 2014).

### 1.3.2 Health care treatment and financial costs

An analysis of treatment cost is especially important with regard to a chronic disease such as psoriasis, as the economic consequences of psoriasis, which often requires lifelong management, both for individuals and the health care system are significant (Javitz, Ward, Farber, Nail, & Vallow, 2002; Yu et al., 2009). The cost of and time needed to care for psoriasis can lead to substantial adverse socioeconomic consequences for psoriasis patients (Ayala et al., 2014). Gunnarsson et al. (2012) showed that per-patient health care expenditures for psoriasis patients were comparable to other major conditions, including diabetes, hypertension, and coronary heart disease. The economic and financial ramifications of psoriasis also appear to be increasing over time. Studies calculating the cost of psoriasis treatment in Ireland do not currently exist and are needed (ISF, 2015). The total annual cost for treating psoriasis in the U.S.A was estimated to be in the range of \$1.6 billion to \$4.3 billion dollars in 2006 (Bhosle, Kulkarni, Feldman, & Balkrishnan, 2006). In 2008, the annual cost of psoriasis in the U.S. was estimated at \$11.25 billion (Fowler, Duh, & Rovba, 2008). A more recent systematic review by Brezinski, Dhillon, and Armstrong (2015) found the direct psoriasis costs ranged from \$51.7 billion to \$63.2 billion, with the indirect costs ranging from \$23.9 billion to \$35.4 billion, and medical comorbidities were estimated to contribute \$36.4 billion annually in 2013 US dollars.

Patients with psoriasis were estimated as having to pay a lifetime cost of \$11,498 for relief of physical symptoms and improvements in emotional health.

One of the main aspects of life is work, not only intended as a necessity for living, but also as a means for personal realization and growth. It is recognized that the physical and emotional effects of psoriasis can have a negative impact on study and employment opportunities (Ayala et al., 2014). The physical disability and emotional distress experienced by patients with psoriasis (which will be further outlined below) can affect their functioning at work. Psoriasis is associated with lower work productivity and a greater number of missed workdays than is experienced by healthy individuals, adding to the financial burden of the disease (Ayala et al., 2014). The ISF (2015) have suggested that approximately 75,000 additional days of work are lost due to psoriasis in Ireland annually. While this represents a productivity loss to society, it also points to a loss of earnings for the individual person who has the condition. Indeed, multiple studies have examined the relationship between psoriasis, symptom severity and income. These studies highlight that income is negatively correlated with psoriasis severity, with people with more severe forms of the condition, on average, earning less than those with mild disease (Hawro et al., 2014; Horn et al., 2007).

### 1.3.3 Psycho-social burden of psoriasis

Psoriasis can affect all aspects of a patient's life, including physical, psychological, social, sexual and occupational elements (de Korte et al., 2014; Kimball et al., 2005). The psychosocial impact of psoriasis has been rated by patients as one of the worst aspects of the disease (Armstrong et al., 2012). The visibility of



psoriatic lesions means that social stigmatization and rejection are common experiences for patients with psoriasis (Kimball et al., 2005; Schneider, Heuft, & Hockmann, 2013). In common with other socially disfiguring conditions, psoriasis patients live with the constant anticipation of being evaluated on the basis of their disfigurement (Beyer & Wolverton, 2010; Fortune et al., 1997, Hayes & Koo, 2010; Kimball et al., 2005; Nash, McAteer, Schofield, Penzer, & Gilbert, 2015). The public are often not well educated about psoriasis and may assume it is contagious (ISF, 2015). In a U.S survey of 17,425 psoriasis patients, 57% reported that others had mistaken their psoriasis as being contagious (Kreuger et al., 2001). This stigmatization due to psoriasis can lead to patients also experiencing shame, helplessness, embarrassment and psychological distress due to their condition (Armstrong et al., 2012; Bhosle et al., 2006).

The general psoriasis literature documents the difficulties experienced by those living with this condition (Parisi et al., 2012). A U.S. study which surveyed the entire membership of the National Psoriasis Foundation in 1998 ( $N = 40,350$ ) (Kreuger et al., 2001). This study found that the most frequent symptoms experienced by the mail-survey respondents were scaling (94%), itching (79%), and skin redness (71%); 39% reported that psoriasis covered 10% or more of their bodies. A total of 6,194 patients with severe psoriasis were then entered into the database for the telephone survey. Of these, 79% reported that psoriasis had a negative impact on their lives, 40% felt frustrated with the ineffectiveness of their current therapies, and 32% reported that treatment was not aggressive enough. The unprecedented response to the survey provided compelling evidence that individuals with psoriasis believe that the disease has a profound emotional and social as well as physical impact on their

quality of life and wellbeing (Kreuger et al., 2001). In a cross sectional study of 936 psoriasis patients, Sampogna, Tabolli, and Abeni (2012) found that the problems that patients experienced most often were shame, anger, worry, difficulties in daily activities and social life. In a cross sectional study of 225 patients, skin discomfort has been reported by up to 37% of psoriasis patients and skin pain by up to 42% (Fortune et al., 2002). Another cross-sectional study of 109 patients with chronic plaque psoriasis found that mood, concentration and sleep were negatively correlated with psoriasis symptoms (Amatya, Wennerstein, & Nordlind, 2008). In an exploratory, longitudinal study of 139 psoriasis patients, Ljosaa, Mork, Stubhaug, Moum, and Wahl (2012) found that skin pain, skin discomfort, sleep disturbance and psychological distress were significantly associated with health related quality of life.

The chronic burden of psoriasis is different than in other chronic illnesses, as it also reflects the inability both to secure lasting day-to-day control, and to prevent recurrent acute relapses (Jobling & Naldi, 2006). The drive for nearly complete clearance of symptoms on a long-term basis can dominate the lives of many patients (Jobling & Naldi, 2006; Parisi et al., 2012). This can involve constant attendance to the illness through physically, psychologically, and socially burdensome treatment regimens (Jobling & Naldi, 2006; Parisi et al., 2012). These regimens can involve the use of topical pharmacological preparations alone or in combination with systemic anti-inflammatory drugs in the long term (Parisi et al., 2012; Schmitt & Ford, 2007). This constant, stigmatizing and often frustrating engagement with the illness can have a profound impact on patients' mental health and psychological wellbeing (Armstrong et al., 2012).

Psychological wellbeing consists of positive relationships with others, personal mastery, autonomy, a feeling of purpose and meaning in life, and personal growth and development (Ryff, 1989). Psychological wellbeing is attained through the achievement of a state of balance affected by both challenging and rewarding life events (Dodge, Daly, Huyton, & Sanders, 2012). Due to the impact of psoriasis, patients can experience a range of psychosocial difficulties, which can impact their psychological wellbeing. These include poor psychological adjustment; maladaptive avoidant coping responses; problems in body image, self-esteem, self-image, self-consciousness, embarrassment, shame, helplessness, stigmatization, social discomfort, isolation, sexual dysfunction, anger and frustration (Armstrong et al., 2012; Augustin & Radtke, 2014; Bhosle, Kulkarni, Feldman, & Balkrishnan, 2006; Hayes & Koo, 2010; Kimball et al., 2005; Rieder & Tausk, 2012; Wahl et al., 1999). In 2002, the largest survey to that date conducted in Europe with respect to the quality of life and wellbeing of people with psoriasis took place, with 18,368 responses from seven European countries (Dubertret et al., 2006). The results from this survey highlighted the burden placed on the daily lives of those who have the condition, with 77% of the respondents reporting that psoriasis was a problem or a significant problem in conducting the activities of daily life. This finding was supported by another United Kingdom based population-based cohort study, which analysed 146,042 patients with mild psoriasis, 3,956 patients with severe psoriasis, and 766,950 patients without psoriasis from a general practice research database (Kurd, Troxel, Crits-Christoph, & Gelfand, 2010). This study found that more than 80 percent of patients reported their condition to be a moderate or large problem in their everyday life (Kurd et al., 2010). From 2003-2011, the U.S. National Psoriasis Foundation carried out semi-annual surveys, which were completed by 5,604 patients. Eighty-eight percent of these

patients reported that psoriasis affects their overall emotional wellbeing, and 82% reported that psoriasis interferes with their enjoyment of life (Armstrong et al., 2012). Of note, the impact of psoriasis on patients' wellbeing was not always proportional to, or predicted by, other measurements of disease severity such as body surface area involvement or plaque severity (Armstrong et al., 2012; Kimball et al., 2005). The effect of psoriasis on a patient's life can vary greatly, depending upon the age of onset and the visibility of psoriatic lesions (Kimball et al., 2010). Psoriasis has been identified as having the greatest impact on the wellbeing in adults aged 18–45 years, a period when individuals are usually the most productive both occupationally and socially (Kimball et al., 2010). The social stigma associated with the disease decreases in mid-life and later, when most people are more established socially and financially, and undergoes a further decrease after age 65 years (Kimball et al., 2010).

#### 1.3.4 Psychological distress

The psychological impact of psoriasis has been identified as being just as debilitating as the physical symptoms, significantly affecting mental and emotional functioning (Hayes & Koo, 2010; ISF, 2015; Kurd et al., 2010; Schmitt & Ford, 2007). This has led to a significant proportion of psoriasis patients suffering from: depression, anxiety and suicidal thoughts (Hayes & Koo, 2010; ISF, 2015; Kurd et al., 2010; Schmitt & Ford, 2007). Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings and sense of wellbeing (American Psychiatric Association [APA], 2013). Individuals who are vulnerable to depression have been theorised as having negative cognitive schemas, which can lead them to viewing their environment in a negatively biased manner (Beck, 1976). When these biases interact with a negative life event, or stressor, these individuals are prone

to engaging in a cycle of negative automatic thoughts about the self, the world, and the future, which can lead to concomitant negative mood (Beck, 1976; Kircanski, Joorman, & Gotlib, 2012). Depression has been characterised as an increased elaboration of negative material, difficulties disengaging from this material, and deficits in cognitive control when processing this material (Kircanski, Joorman, & Gotlib, 2012). Depressive disorders are characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration (APA, 2013). Depression can be long-lasting or recurrent, substantially impairing an individual's ability to function at work or school or cope with daily life. At its most severe, depression can lead to suicide (WHO, 2017). Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like palpitations (APA, 2013). People with anxiety disorders usually have recurring intrusive thoughts or concerns, which may lead them to avoid difficult situations due to worry (APA, 2013). Rates of depression and anxiety amongst psoriasis patients have been found to be high. Rates of depression have been found to range between 6% and 62% (Fortune et al., 2005, ISF, 2015; Kimball et al., 2011; Richards, Fortune, Griffiths, & Main, 2001; Schmitt & Ford, 2007). A systematic review of 938,194 patients from 15 papers found that the prevalence of anxiety in patients with psoriasis ranged from 7% to 48% (Fleming et al., 2017). The wide ranges of reported anxiety and depression prevalence in psoriasis patients in these studies may be due to the lack of consistency in their measurement and wide array of measurements tools used. For example, in Fleming et al. (2017), studies which used clinical diagnosis or self-reported anxiety found a prevalence of 7-16%, while studies which used the HADS-A questionnaire reported higher rates of 20-50%. Psoriasis patients have been found to have higher rates of depression and anxiety

when compared to patients with acne, atopic dermatitis, leprosy, vitiligo or lichen planus (Hayes & Koo, 2010). In the large scale population-based cohort study reported above, Kurd et al. (2010) demonstrated an increased risk of depression and anxiety in patients with psoriasis when compared with controls. They estimated that in the UK, an excess of 10,400 diagnoses of depression and 7,100 diagnoses of anxiety were attributed to psoriasis annually. Kurd et al. (2010) reported that the risk of these psychiatric outcomes are particularly elevated in younger patients with psoriasis, with the highest risk of depression found in young males with severe psoriasis. This result was not expected, as in the general population with few exceptions, the prevalence and incidence of depressive disorders are higher in females than in males, beginning at mid-puberty and persisting through adult life (Piccinelli & Wilkinson, 2000). To account for this finding the authors point to the high rates of excess alcohol consumption in men with psoriasis, a hypothesis that has also been posited in other studies (Hayes & Koo, 2010; Poikolainen et al., 1990). Kurd et al.'s (2010) findings were adapted to reflect the Irish setting by the Irish Skin Foundation, who based on Irish prevalence figures, estimated that there are 864 diagnoses of depression and 593 diagnoses of anxiety attributable to psoriasis annually in Ireland (ISF, 2015). While the potential contributing factors of depression in psoriasis are varied, the most important predictors of depression found in the research literature are: poor quality of life and wellbeing, increased rates of pruritis, social stigmatization, lack of social support, joint manifestations, and poor treatment adherence (Hayes & Koo, 2010; Rieder & Tausk, 2012). Pathologic worrying and social anxiety, related to perceived stigmatization and anticipated difficulty in interpersonal relationships have been identified as potentially the strongest predictors of anxiety in psoriasis patients (Fortune et al., 1997; Hayes & Koo, 2010; Richards et al., 2001). Studies that have

probed the link between psoriasis and depression hint towards a reciprocal relation between them, or the two conditions may simply co-exist (Bhosle et al., 2006; Kimball et al., 2011). Depression tends to be accompanied by a distinct deterioration of the care indicators of psoriasis (number of days ill or unable to work, office visits) and with treatment adherence (Augustin & Radtke, 2014). Psoriasis may lead to anxiety and/or depression, however resolution of psoriasis may not resolve a patient's anxiety and/or depression (Fortune et al., 2004). In a study of 414 hospital inpatients, Sampogna, Tabolli, and Abeni (2007) explored the complex relationship between clinical improvement in psoriasis and patient psychological morbidity. Using validated questionnaires to assess psoriasis severity in patients with minor psychologic disorders, the authors found that the frequency of psychological disturbance decreased with improvement in clinical severity and symptoms of dermatologic disease. However, one-third of people with complete clearance of their psoriasis still presented psychosocial difficulties at follow-up (Sampogna et al., 2007).

Due to the heavy psychological and psychosocial burden that psoriasis can have on the mental health and psychological wellbeing of those with the condition, psoriasis patients have been found to be twice as likely to have thoughts of suicide compared to the general population and people with other chronic diseases (Griffiths & Richards, 2001; Hayes & Koo, 2010). In the Kreuger et al. (2001) study outlined above ( $N = 40,350$ ), nearly 7% of the respondents of the survey reported contemplating suicide because of their condition. Those in the younger age groups experienced feeling the greatest impact, with 10% of those aged 18 to 34, disclosing incidences of suicidal ideation (Kreuger et al., 2001). Suicidal ideation appears to be most common in patients who rate their psoriasis as severe (Kimball et al., 2005).

Kurd et al. (2010) attributed 350 cases of suicidality (suicidal ideation, suicide attempt, or suicide) directly to psoriasis. Applying this study's estimates to the Irish setting, based on the Irish prevalence figures, the ISF (2015) estimate that there may be 29 cases of suicidality (suicidal ideation, suicide attempt, or suicide) attributable to psoriasis annually in Ireland.

Psychological distress prevents optimal self-management, which may exacerbate psoriasis flares, thereby creating a vicious cycle (Bundy et al., 2014). Much of the psychological morbidity observed in dermatology patients is never fully addressed or treated, as these patients often do not present to mental health providers (Picardi, Amerio, & Baliva, 2004; Richards, Fortune, Weidman, Sweeney & Griffiths, 2004; Rieder & Tausk, 2012). This problem is compounded by the inability of dermatologists to address mental health morbidity in their patients (Magin, Adams, Heading, & Pond, 2009). This is due to their limited experience in understanding of the chronic psychological impact of skin disease and the detection of underlying psychiatric diagnoses of psychological issues (Magin, Adams, Heading, & Pond, 2009). The physical pain and seriousness of the disease, its adverse emotional and psychological effects, inadequate access to psychological treatments and lack of a cure can lead to a cycle of despair (Armstrong et al., 2012). In order for this cycle to be broken, and for the psychosocial burden of psoriasis to be ameliorated, psoriasis patients need increased access to comprehensive, quality assessment and psychological treatment as part of routine care (Armstrong et al., 2012; Augustin & Radtke, 2014; Bundy et al., 2014).

#### 1.4 The stress coping process



Limited research exists with psoriasis patients that has attempted to understand how psoriasis patients cope with their condition. The following section will outline theories on stress coping relevant to this thesis and how these relate to the experience of having psoriasis. These theories will underpin this PhD's attempt to understand how the distress experienced by psoriasis patients may manifest, and then how this distress may be ameliorated through mindfulness interventions. The following section will then outline the potential for psychological supports for this condition.

Coping is a set of responses to stressful events by which a person can modulate her or his reactions to stressors and attenuate psychological outcomes (Fortune et al., 2002). When an illness such as psoriasis occurs, a patient is faced with a very difficult and stressful task of adjusting to restrictions imposed by the disease itself and its psychological sequelae (Zalewska, Miniszewska, Chodkiewicz, & Narbutt, 2007). Coping with the chronic nature of psoriasis, the lack of control over unexpected outbreaks, its symptoms, the associated disability coupled with the psychosocial burden and wellbeing impacts can be a challenge for a significant proportion of the population (Colombo & Perego, 2014). Adaptation to and coping with psoriasis is a complex and stressful process, determined by both external factors (e.g., social support, life circumstances) and internal ones (e.g., personal resources, defence mechanisms, one's beliefs and expectations, and strategies for coping with stress) (Sakson-Obada, Pawlaczyk, Gerke & Adamski, 2017; Zalewska et al., 2007).

Stressful events are thought to influence the pathogenesis of physical disease such as psoriasis by causing negative affective states (e.g., feelings of anxiety and depression), which in turn exert direct effects on biological processes or behavioral

patterns that influence disease risk (Cohen, Kessler, & Gordon, 1995). Exposures to chronic stress (such as living with long-term medical conditions like psoriasis) are considered the most toxic because they are most likely to result in long-term or permanent changes in the emotional, physiological, and behavioral responses that influence susceptibility to and course of disease (Cohen, Kessler, & Gordon, 1995; McEwan, 1998). According to Gupta and Gupta (1995), daily exposure to chronic, low-intensity stress, resulting from negative image of one's body and the feeling of social rejection, has a greater influence on the course of psoriasis than acute single-event stress.

#### 1.4.1 Transactional theories of stress and coping

The two most relevant stress coping theories to aid the understanding of the coping experiences of psoriasis patients who will engage in mindfulness practice in this thesis, which will be outlined presently, are the works of Lazarus and Folkman (1984) and Moos (2002; 1984). These theories were selected as underpinning theories for this thesis, rather than other potentially applicable models such as Leventhal, Diefenbach, and Leventhal (1992)'s Common Sense Self-Regulatory Model (CSM). Leventhal et al.'s (1992) model has been used in the psoriasis literature previously (e.g., Howells et al., 2018; Nelson et al., 2017) to explore how individuals respond to and cope with the emotional and behavioural demands involved in living with psoriasis. Lazarus and Folkman (1984) and Moos (2002; 1984) were selected rather than Leventhal et al. (1992), due to the clearer fit between these theories' appraisal and coping processes and the practice of mindfulness, and the lack of explicit focus on outcomes in the CSM. Lazarus and Folkman (1984) and Moos (2002; 1984) highlight processes through which reappraisal of a stressor can occur through mindfulness

practice. This reappraisal e.g. now seeing it as benign, could then allow a patient to move from an avoidant to a more approach oriented style of coping (explained in more detail below). This process could then potentially ameliorate psychological distress and improve wellbeing. These procedures can more easily be mapped onto psoriasis patients' experience of mindfulness meditation, which the participants in the empirical studies in chapters 4, 5 and 6 will have engaged in, and any potential improvements in outcomes, than would be possible if the CSM were used. For example, through mindfulness meditation, psoriasis patients may be able to decenter from the primary appraisal of a stressor and then reappraise this stress as a temporary phenomenon through enhanced metacognitive skills – with mindfulness meditation in this instance turning down the attenuation of the primary stress appraisal. This may lead the patient to approach the source of this stress, process it and allow it to pass, which may lead to reduced anxiety. It is this hoped that the selection of Lazarus and Folkman (1984) and Moos (2002; 1984) as underpinning theories will provide greater theoretical clarity as to how changes in anxiety, depression and wellbeing due to mindfulness meditation may occur.

Lazarus (1966) contended that stress does not exist in the event but rather is a result of a transaction between a person and his or her environment. The transactional theory of stress and coping defines stress as “a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus & Folkman, 1984, p. 19). Lazarus (1966) and Lazarus and Folkman (1984) asserted that the primary mediator of person–environment transactions was appraisal (Lyon, 2012; Matthieu & Ivanoff, 2006). The experience of stress specifically results not from events

themselves but from the appraisal that such events tax or exceed a person's adaptive capacity (Weinstein, Brown, & Ryan, 2009). In this appraisal process, events are perceived as good, bad, or neutral, positive or negative, or as involving challenge (generally positive appraisals) or threat, harm, or loss (negative appraisals) (Lazarus & Folkman, 1984; Lazarus, 1966). Individuals often appraise a situation in a way that alters its emotional significance or meaning, either by changing their view of the situation or their perceived capacity to manage the demands that it presents (Lazarus, 1966; Lazarus & Folkman, 1984). Much of the stress literature is devoted to establishing why some thoughts are stressful and others are not (Lebois et al., 2015). Ursin and Erikson (2004) suggest that stress occurs when a mismatch takes place between an event one anticipates in the world and what actually happens. Together with this expectation violation, a combination of additional factors contributes to making an event stressful, in particular: perceived self-threat, perceived inability to cope effectively (inefficacy), the objective severity of the stressor, the individual's resilience and vulnerability, negative emotion, and the associated neuroendocrine response (Almeida, 2005; Almeida, Wethington, & Kessler, 2002; Lazarus, 1999, 1993; Scherer, 2001). Appraisals can change over time due to coping effectiveness, altered requirements, or improvements in personal abilities (Matthieu & Ivanoff, 2006). In the context of having psoriasis, it may not be the fact that the person has a chronic skin disease that may lead to negative appraisals. It may be the visible nature of psoriasis and fears of embarrassment, which may be perceived as more threatening or harmful by the patient. Psoriasis can occur and reoccur at any time in a person's life, which makes it a difficult condition to manage both medically and psychologically. This is due to the constant state of threat that psoriasis poses and negative thoughts and emotions, e.g., self-critical thinking, which can accompany it

after occurrence. This can consistently tax the coping capacities and effectiveness of patients, which can result in a spiral of negative appraisals that can generalise into other aspects of the patient's life.

#### 1.4.2 Appraisal types

Lazarus and Folkman (1984) identified three types of appraisal: primary, secondary, and reappraisal. Primary appraisal is a judgment about what the person perceives a situation holds in store for him or her. Specifically, a person assesses the possible effects of demands and resources on wellbeing (Lazarus & Folkman, 1984). According to Lazarus and Folkman (1984), primary appraisal is broken into three types: (a) irrelevant, where the individual has no vested interest in the transaction or results, (b) benign positive, in which the individual assumes that the situation is positive with no potential negative results to his or her wellbeing, and (c) stressful, where the individual only perceives negative results or that the circumstances are detrimental to his or her wellbeing, e.g., for psoriasis patients, scaling plaques can limit the types of clothing patients can wear. This is due to the irritations that certain types of clothing like elastic waistbands, socks and underwear can cause psoriasis patients.

#### 1.4.3 Secondary appraisal

The perception of threat triggers secondary appraisal, which is the process of determining what coping options or behaviors are available to deal with a threat and an individual's evaluation of his or her ability to handle the event or situation (Lazarus, 1999; Lyon, 2012; Matthieu & Ivanoff, 2006). Lazarus and Folkman (1984) theorized that in order to determine the magnitude of an event or situation using

secondary appraisal, an individual focuses on one of three perceptions: (a) a potential for harm or loss (threat) or that (b) actual harm has already occurred (harm), or (c) the situation has potential for some type of gain or benefit (challenge). When psoriasis is initially appraised as challenging, harmful, or threatening, an activation of physiological systems involved in the stress response co-occurs with a subjective experience of distress. The biopsychosocial sequelae of the stress reaction result from an evaluation of one's resources as insufficient to negotiate the physical and psychological challenge presented by their psoriasis. Such stress appraisals may result in prolonged hypothalamic-pituitary-adrenal (HPA) axis activation, leading to a disruption in the homeostasis of multiple body systems through the cortisol-mediated stress response, which in turn is a significant regulatory factor for disease-generating events such as psoriasis flares (Lazarus & Folkman, 1984; Lyon, 2012; Matthieu & Ivanoff, 2006). Three secondary appraisal components have been distinguished: (a) blame or credit: results from an individual's appraisal of who is responsible for a certain event, e.g., self-critical thinking in psoriasis patients may lead to patients blaming themselves for a psoriasis flare, (b) coping potential: a person's evaluation of the prospects for generating certain behavioral or cognitive operations that will positively influence a personally relevant encounter, e.g., does the psoriasis patient feel that they can manage the latest psoriasis flare they have just experienced?, and (c) future expectations: the appraisal of the further course of an encounter with respect to goal congruence or incongruence, e.g., will having psoriasis impact the patient's goal of getting married? As secondary appraisal is purely a cognitive process, coping efforts have not been instituted at this point. Depending on the nature of the primary appraisal, the secondary appraisal can be influenced by contextual-level factors such as demands, constraints, and opportunities (Lazarus, 1999). The resulting appraisal

then generates an emotion, or meaning, attributed to the particular event or situation. The individual is now able to move from thinking to action about how they will cope with their psoriasis (Lazarus, 1999).

Reappraisal is the process of continually evaluating, changing, or re-labeling earlier primary or secondary appraisals as a situation evolves (Lazarus, 1966; Lazarus & Folkman, 1984). What was initially perceived as threatening may now be viewed as a challenge or as benign or irrelevant. What occurs during appraisal processes determines emotions and coping behaviors (Lazarus, 1966; Lazarus & Folkman, 1984). A particularly important construct in Lazarus and Folkman's (1984) theory is that of positive reappraisal. Positive reappraisal, a form of meaning-based coping, is the adaptive process by which stressful events are reconstrued as benign, valuable, or beneficial (Gross & Munoz, 1995; Lazarus & Folkman, 1984). In order to ameliorate the distress that psoriasis patients experience due to the condition, supporting a patient's capacity for positive reappraisal of their psoriasis and the difficulties it imposes is likely to be important. Adaptive stress processing in this way, including more benign cognitive appraisals of stress situations and adaptive coping with stress, is considered likely to underpin improvements in psoriasis patient mental health and wellbeing (Gross & Munoz, 1995; Lazarus & Folkman, 1984).

#### 1.4.4 Coping

After a psoriasis flare has been appraised, by the patient, meaning and emotions are generated, coping then ensues (Lazarus & Folkman, 1984). Coping is defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the

resources of the person” (Lazarus & Folkman, 1984, p. 141). Coping is an interaction between the psoriasis patient’s internal resources and external environmental demands (Lazarus & Folkman, 1984). Coping is a stabilizing factor that can help patients maintain psychosocial adaptation during stressful periods (Moos & Schaefer, 1993; Lazarus & Folkman, 1984). It encompasses cognitive and behavioural efforts to reduce or eliminate stressfulness of having psoriasis and associated emotional distress (Moos & Schaefer, 1993; Lazarus & Folkman, 1984), and can directly and indirectly affect subsequent appraisals (reappraisals), and it is therefore also a causal antecedent of the emotion that follows (Lazarus, 1991b).

#### 1.4.5 Coping strategies

Lazarus and Folkman (1984) identified two forms of coping strategies. Problem-focused coping strategies are similar to problem-solving tactics. These strategies encompass efforts to define the problem, generate alternative solutions, weigh the costs and benefits of various actions, take actions to change what is changeable, and, if necessary, learn new skills. Problem-focused efforts can be directed outward to alter some aspect of the environment or inward to alter some aspect of self (Lyon, 2012). Problem-focused coping can involve channeling efforts to behaviorally handle distressing situations such as visible psoriasis plaques, gathering information, decision making, conflict resolution, resource acquisition (knowledge, skills, and abilities), and instrumental, situation-specific, or task-oriented actions (Folkman & Moskowitz, 2000; Mattieu & Ivanoff, 2006).

Emotion-focused coping involves positive reappraisal (Lazarus, 1999) and for psoriasis patients these strategies are directed toward decreasing the emotional



distress the condition can cause. These tactics include such efforts as distancing, avoiding, selective attention, blaming, minimizing, wishful thinking, venting emotions, seeking social support, exercising, and meditating. Unlike problem-focused strategies, emotion- focused strategies do not change the meaning of a having psoriasis directly, and is the more common form of coping used when events are not changeable (Lazarus & Folkman, 1984). Meta-analyses carried out by Penley, Tomaka, and Weibe (2002) found that emotion-focussed strategies are often less effective than using problem-focussed methods in relation to physical and psychological health outcomes. Emotion-focused coping strategies that ignore or avoid a source of stress have also been consistently been given a prominent position in theoretical and clinical accounts of the maintenance of anxiety and depressive disorders through increased rumination and worry (Nolen-Hoeksema 2000; Watkins 2008).

#### 1.4.6 Emotion

A further concept introduced by Lazarus (1999) is the idea of emotion as a process, and what he has called the core relational themes. An emotion is generated in the course of four stages: 1) anticipation, 2) provocation, 3) the unfolding and 4) the outcome. Anticipation deals with warnings of an upcoming harm or benefit that are conceived to be related to both anticipatory emotions such as anxiety and anticipatory coping, which are powerful adaptational tools in humans. Provocation implies any occurrence that is perceived as having changed the person-environment relationship in the direction of harm or benefit, e.g., a recent psoriasis flare. The unfolding is an immediate stage after the start of an emotional reaction of the patient, which delimitates the beginning of its unfolding or flow. This process also depends on the

psoriasis patient's emotional and coping reactions that provide feedback to the unfolding process. The outcome stage of an emotion is an emotional state that takes origin from the cognitive appraisal of a situation in terms of the wellbeing of the psoriasis patient.

Another important construct in Lazarus's (1991; 1966) transactional model is stress emotions. Although thoughts precede emotions, (that is, emotions are shaped by thought processes) emotions can in turn affect thoughts. The primary appraisal of physical and psychological threat caused by psoriasis and the specific meaning of it triggers a particular stress emotion consistent with its meaning (Lyon, 2012). There are three meta-theoretical assumptions in Lazarus and Folkman (1984) theory on emotions: transaction, process, and context. It is assumed, first, that emotions occur as a specific encounter of the person with the environment and that both exert a reciprocal influence on each other (e.g., the threat of a psoriasis flare causes stress, and this stress increases the likelihood of a flare). Second, that emotions and cognitions are subject to continuous change, and third, that the meaning of a transaction is derived from the underlying context, i.e., if psoriasis occurs on a visible area of the body such as the face or hair, this is likely to lead to more intense negative emotions and resulting action tendencies.

#### 1.4.7 The functioning of the stress coping process

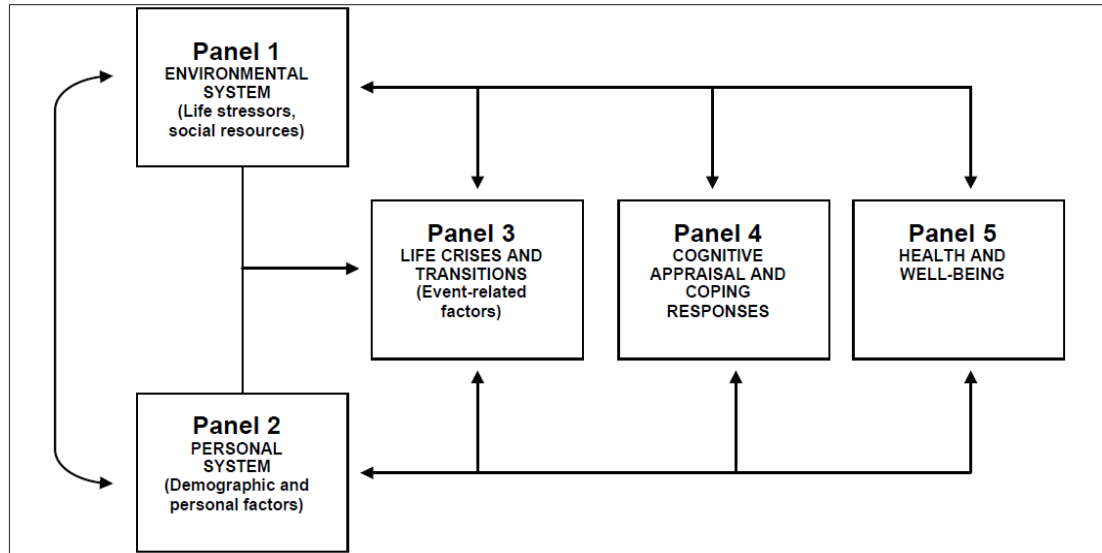
Lazarus (1966) and Lazarus and Folkman (1984) link stress-related variables to health-related outcomes such as psoriasis. All of the constructs in their transactional model, when taken together, affect adaptational outcomes. The theorists propose three types of adaptational outcomes: (a) functioning in work and social

living, (b) morale or life satisfaction, and (c) somatic health. They view the concept of health broadly to encompass physical (somatic conditions, including illness and physical functioning), psychological (cognitive functional ability and morale—including positive and negative effects regarding how people feel about themselves and their life, including life satisfaction), and social (social functioning) (Lyon, 2012).

#### 1.4.8 Moos's stress coping theory

Lazarus's transactional theory of stress has been further refined by Moos (2002; 1984), who offered a general conceptual framework, which emphasizes the central mediating role of cognitive appraisal and coping responses in the stress process, and a series of examples in which approach coping (or problem-focused) and avoidance coping (a form of emotion-oriented coping) may contribute to adaptive functioning (Chun, Moos, & Cronkite, 2006). Moos' model (2002; 1983) places emphasis on both (see Figure 1-1) and translates Lazarus' meta-theoretical principles into five panels, which are relevant to psoriasis patients. Panel 1 (environmental system) is composed by ongoing life stressors, like work stress, and social coping resources, such as received advice from family members, friends, the partner, or groups and organizations. Panel 2 (the personal system) involves socio-demographic characteristics and personal coping resources, such as self-confidence, self-efficacy beliefs, and other trait-related dimensions. Environmental and personal systems influence the life crisis or transition that individual's experience (Panel 3), and the combined influence of personal and environmental factors determine health and wellbeing (Panel 5), both directly and indirectly through cognitive appraisal and coping (Panel 4). In addition, there are bidirectional paths, indicating that feedback loops can occur at each stage of the process (Chun et al., 2006; Holahan, Moos, &

Schaefer, 1996). One of the key strengths of this model lies in its emphasis on the contextual factors in the stress and coping process, which makes it easily applicable to psoriasis patients (Chun et al., 2006; Holahan et al., 1996).



Source: Adapted from Moos, 1994

FIGURE 1  
A general conceptual framework of the stress and coping process

**Figure 1-1.** A general conceptual framework of the stress and coping process.

Source: Moos and Schaefer (1993).

#### 1.4.9 Approach and avoidant coping

Moos (2002; 1984) highlighted the distinction between approach and avoidance coping. Avoidant coping reflects a defensive form of regulation that involves ignoring, distorting, or escaping threatening stimuli, e.g., ignoring and not acknowledging the emotions, such as sadness or anger that can accompany psoriasis. Several research groups have conceptualized avoidant coping in terms of behavioral disengagement, mental disengagement, withdrawal, distraction from cues and denial (Deisinger, Cassisi, & Whitaker, 1996; Fontaine, Manstead, & Wagner, 1993; Stowell, Kiecolt-Glaser, & Glaser, 2001). While avoidant coping can reduce distress in the short-term, it may be ineffective in supporting wellbeing (Davies & Clark,

1998). In contrast, approach coping involves a cognitive, emotional, or behavioral ‘turning toward’ stressful situations. Three predominant forms have been consistently identified: active coping (direct action to deal with psoriasis, e.g., taking medication regularly), acceptance (cognitive and emotional acknowledgement of having psoriasis), and cognitive reinterpretation (learning, finding the good in and seeing having psoriasis as an opportunity to develop resilience, and develop as a person) (Fortune et al., 2002).

Approach coping is generally considered adaptive in that effort is directed toward resolving stressful situations or overcoming the stress associated with psoriasis. As a result, these strategies are believed to facilitate the assimilation and transcendence of this stress in a way that ultimately enhances mental health and wellbeing (Weinstein et al., 2009). In general, people who rely more on approach coping tend to adapt better to life stressors and experience fewer psychological symptoms (Holahan et al., 1996). Approach coping strategies, such as problem solving and seeking information on psoriasis, can moderate the potential adverse influence of both negative life change and enduring role stressors on psychological functioning (Weinstein et al., 2009). Avoidance coping (or safety-seeking behaviour in cognitive accounts) has consistently been given a prominent position in theoretical and clinical accounts of the maintenance of emotional disorders such as anxiety and depression (de Silva & Rachman, 1984; Salkovskis, 1996a; 1996b; Wells et al., 1995). In the context of physical illness, avoidant forms of coping, such as denial, have been found to be detrimental in the longer term after a health crisis (Chun et al., 2006). Menaghan (1983) explained that efforts to manage unpleasant feelings by resignation and withdrawal may increase distress and thus amplify future problems. In

terms of the Holahan and Moos' (1991, 1990) model of coping, individuals who are flexible in their choice of coping should show better adaptation than persons who have a more restricted or rigid coping style (Holahan et al., 1996).

Avoidance and passive coping are common in psoriasis patients (Bundy et al., 2013). In a cross sectional study of 317 patients, Rapp, Feldman, Exum, Fleischer, and Reboussin (1999) showed that psoriatic patients commonly used avoidant coping strategies such as covering the lesions and avoiding people, all of which were associated with a significantly negative impact on the patient's quality of life. Indeed, based on results from an experimental study of 120 patients and controls, Fortune et al. (2003) suggested that patients with psoriasis show marked differences in the processing of emotionally valenced stimuli compared with controls, suggesting a hypervigilance for threat leading to attempted avoidance of such threat. One third of psoriasis patients have also been found to suffer from pathological worry and anxiety, with avoidance behavior being the main contributing factors in retaining the stress this causes leading to patients suffering persistent stress (O'Leary et al., 2004). Avoidance of anxiety-provoking situations has been associated with greater levels of anxiety (Fortune et al., 2002; Fortune et al., 2004). Various authors have also suggested that avoidance coping, social isolation and impaired quality of life may lead to depression, anxiety, stress-related disorders, and even to suicidal ideation in psoriasis patients (Gupta & Gupta, 1998; Kimball et al., 2005; Kurd et al., 2010; Sampogna et al., 2007; Schmitt & Ford, 2007b, 2010).

#### 1.4.10 Mindful stress coping

A psoriasis patient's cognitive appraisal of their condition, definition of adaptive tasks, and selection of coping skills are influenced by the person, by aspects of the transition or crisis, and by their environment (Creswell, 2015). Interventions that can be directed at, and improve on one or more of these sets of factors through enhanced personal competence, coping skills and social resources will likely help patients cope with the condition and the stress it causes (Creswell, 2015; Weinstein et al., 2009). Mindfulness based interventions, which will be outlined further in chapter 2, have been theorised to have the capacity to enhance these factors, and the mental health and wellbeing of patients of various physical and mental health issues through: (1) teaching individuals to approach, recognise and reduce the sources of stress, (2) increased exposure to and more acceptance of uncomfortable internal stimuli and arousing sensations as they occur, leading to (3) a less defensive, more willing exposure to challenging and threatening events and experiences, which may reduce negative cognitive appraisals of those situations, thus rendering lower levels of perceived stress, and (4) by helping patients to modulate the stress response by decentering from stress appraisals into a metacognitive mode, allowing the person to reappraise the stressful event as an impetus for growth or a source of benefit (Arch & Landy, 2015; Baer, 2003; Brown et al., 2007; Kabat-Zinn, 1982; Ruff & MacKenzie, 2009; Weinstein et al., 2009). Thus, mindfulness may promote cognitive change by a 'turning down' or attenuation of negative appraisals of events (Weinstein et al., 2009). Increased mindfulness may allow psoriasis patients to reduce the threat value of aversive experiences (modify appraisal), alter the generation of emotional response to aversive experience (modify emotional response), or increase the capacity to tolerate, regulate, and recover from negative emotions triggered by aversive experience, which may reduce negative appraisals of affective stimuli overall (Arch & Landy, 2015).

With repeated mindfulness practice, associations between emotionally evocative stimuli and maladaptive responses can become increasingly less salient and more adaptive responses may become increasingly dominant (Lynch et al., 2015). The reappraisal of negative stimuli may result in positive emotions such as self-compassion and acceptance, which reduce stress and in turn influence subsequent appraisal processes (Brown et al., 2015). Thus, the practice of mindfulness may facilitate and strengthen the capacity for positive reappraisal (Lynch et al., 2015). Through a number of different mechanisms, mindfulness meditation may serve as a protective factor for psoriasis patients against the catabolic effect stress can have on disease pathogenic processes (Brown et al., 2012; Creswell, 2015). Mindfulness meditation may do so by buffering stress responding and support more constructive affect responses to social evaluative stress (Brown et al., 2012; Creswell, 2015). For example, if a psoriasis patient is worrying about the future, this may foster subjective stress which may lead to an experience of anxiety. If a person is ruminating about the past, this may fuel negative self-judgements, which may lead to depression (Kabat-Zinn, 2003; McCullough et al., 2007). In both of these examples, mindfulness meditation may promote wellbeing, and reduced anxiety and depression through more adaptive re-appraisal by disrupting over-attachment or fusion to worried or ruminative thoughts (Hayes et al., 2013) and maladaptive cognitive appraisals (Chambers, Gullone, & Allen, 2009).

#### 1.4.11 Potential for psychological supports

In order to support psoriasis patients' abilities to cope with the burden of psoriasis on their lives, this patient group is a good candidate for psychological intervention (Bundy et al., 2013; Kimball et al., 2005; Zachariae et al., 1996).



However, despite the high rates of distress, the repeatedly demonstrated association between psoriasis, anxiety, depression, and reductions in wellbeing, patients with psoriasis have historically been somewhat invisible in clinical psychology practice (Bundy et al., 2013; Fortune et al., 1997; Moon, Mizara, & McBride, 2013; Wahl et al., 1999). Addressing the biopsychosocial adjustment of psoriasis patients is an area that has been neglected, with dermatologists generally failing to recognize patients' psychological distresses and when they do identify anxiety or depression, failing to take action due to inadequate time or training (Bundy et al., 2013; Fortune et al., 1997; Moon et al., 2013; Wahl et al., 1999). Nash et al. (2015) using a large-scale postal self-administered questionnaire completed by members of the Psoriasis Association of the UK and NI ( $N=1,564$ ) identified that despite 54% of respondents experiencing emotional distress, only 13% of those affected received professional help for it. Despite the high levels of psychological distress experienced by patients, the provision of psychology services in the UK for patients with skin disease is, at best, limited. In spite of clear demand, only 4% of dermatology units in the United Kingdom provide a dedicated counselling service (Bewley, Fleming, & Taylor, 2012). Such research has not been conducted in Ireland; however, it is likely that Irish patients have to deal with similar high levels of undermanaged distress due to the fact that no dedicated counseling service dealing with psoriasis patients exist in Ireland. Inadequate access to psychological interventions and the lack of a cure for psoriasis can lead to further stress, anxiety and depression, and these unaddressed mental health issues can prevent patients from effectively managing their disease (Armstrong et al., 2012). The disconnect between patients' and doctors' understanding of psoriasis and its potential psychological ramifications is potentially dangerous, as suicidal ideation or comorbid substance misuse may also be overlooked. The findings outlined earlier

in this chapter on the psychological morbidity, the effects of living with psoriasis on well-being and its psychosocial burden indicates a need that is currently not being met and underscores the importance of addressing not only the physical but also the psychosocial aspects of psoriasis, and of adopting a multidisciplinary approach to psoriasis management (Schneider, Heuft, & Hockmann, 2013). Addressing the psychological impact that psoriasis has on patients through a multidisciplinary approach by providing psychosocial and emotional support could be empowering and could be expected to improve patient health and functioning by: improving patients' stress coping strategies, strengthening personal competence, enhancing wellbeing, reducing anxiety and depression and increasing patients' capacity to more effectively manage their treatment regime, all of which may also ameliorate psoriasis flares (Armstrong et al., 2012; Bundy et al., 2013; Creswell, 2015; Fortune et al., 2002; Griffiths & Richards, 2001; Kimball et al., 2005). Doing so is likely to reduce the financial and psychological cost that a chronic disease such as psoriasis extracts from the individual suffering from psoriasis, their families, the taxpayer and society as a whole.

Several studies have reported that various psychosocial interventions can play a key role in psoriasis management by targeting psychological variables, e.g., beliefs and emotions that influence skin symptom severity, distress and related wellbeing (Janowski & Pietrzak, 2008; Kimball et al., 2005; Lavda, Webb, & Thompson, 2012). Patients with psoriasis treated for symptom management with Cognitive Behavioural Therapy (CBT), individually and in groups, have shown improvements in both distress and psoriasis severity (Bundy et al., 2013; Fortune et al., 2002; Fortune et al., 2004). A six-week course of adjunctive CBT was shown to moderately improve

anxiety, depression, and stress as well as psoriasis lesions in a case–control study of 40 patients with psoriasis who received integrated CBT plus standard psoriasis treatment and 53 controls who received standard treatment alone (Fortune et al., 2002). Patients in this study showed a significant clinical severity of psoriasis (PASI) at 6 weeks, which was maintained at 6 months follow-up. Standard care patients showed a non-significant reduction in clinical severity of psoriasis at 6 weeks and 6 months, respectively. Similarly, 64% of patients in the CBT group achieved >75% clearance of their psoriasis compared with 23% of standard care patients at 6 months follow-up. This represented a significant effect of adjunctive CBT over standard care (Fortune et al., 2002). In a randomized controlled trial (RCT) ( $N=135$ ) a novel, tailored, web-based form of CBT for patients with chronic plaque psoriasis versus a wait list control showed benefits in anxiety reduction and quality-of-life improvement. These results were limited by a large amount of missing data (Bundy et al., 2013). Interventions including psychodynamic psychotherapy (Koblenzer, 1995) (targeting underlying psychopathology via exploration of unconscious conflicts), arousal reducing techniques (Panconessi, Galassi, Sarti, & Bellini, 1998), behavioural therapies (Noren, 1995), habit reversal (which aims at modification of unhelpful behaviours such as scratching), written emotional disclosure (expression of distress through writing) (Vedhara, Morris, & Booth, 2007) and structured sessions of group or one-on-one psychotherapy comprising stress management, guided imagery, and relaxation have demonstrated benefits in psoriasis patients (Fordham et al., 2013; Lavda et al., 2012). In a meta-analysis of 22 intervention studies on the effectiveness of psychological interventions for adults with skin conditions, Lavda et al. (2012) found that the psychological interventions investigated to have a medium-sized effect on skin conditions ( $g = 0.54$ ). The type of skin condition, age of sample, nature of the

intervention, time interval between the end of the intervention and follow-up, and type of outcome measure all moderated the effect of interventions on outcomes. For example, interventions had a medium effect on the severity of the condition ( $g = 0.40$ ) and psychosocial outcomes ( $g = 0.53$ ), and a medium- to-large effect on itch scratch reactions ( $g = 0.67$ ). Lavda et al. (2012) concluded that psychological interventions are beneficial for people with skin conditions. However, though specific psychological interventions, such as habit reversal, relaxation and CBT, have been developed and received support for their effectiveness in reducing psoriasis, this evidence base has limitations. Studies have included small samples, contained no control group, no follow-up data and/or high levels of missing data (Lavda et al., 2012; Shah & Bewley, 2014). It is clear that psychological interventions could be beneficial to people with skin conditions, but there is also a need to develop a broader evidence base (Lavda et al., 2012; Shah & Bewley, 2014). This is also a need to develop further specific interventions and to conduct more rigorous evaluation of these, including assessment of effects over longer follow-up periods (Lavda et al., 2012; Shah & Bewley, 2014).

### 1.5 Summary and conclusion

Psoriasis is a chronic skin condition with a worldwide prevalence, which carries a heavy psychosocial burden. It is clear from the limited research that has been carried out with psoriasis patients, that psychological interventions might be effective in supporting a psoriasis patient's mental health and wellbeing. However, the mental health and wellbeing needs of psoriasis patients have largely been ignored in psychological and dermatological research and practice. This chapter presented an overview of stress coping theories most relevant to psoriasis patients and this thesis's

aims (which will be outlined in chapter 2.6), with a view to understanding how psoriasis can impact patients stress coping capacities. This chapter also presented a rationale based on the preceding stress coping theories, of the potential effectiveness that the development of mindfulness based coping skills may have on the mental health and wellbeing of psoriasis patients. The next chapter will build on the present chapter and will present the literature on mindfulness and mindfulness based interventions. This chapter will focus on how these interventions may be effective in supporting patients to deal with the psychosocial burden of psoriasis and improve their anxiety, depression and wellbeing before setting out this thesis's aims and objectives.

## **Chapter 2: Introduction: Mindfulness**

### 2.1 Mindfulness

Mindfulness is an umbrella term used to characterize a large number of meditative practices, processes, and characteristics (Van Dam et al., 2018). The psychological literature on mindfulness reveals considerable variance in descriptions of the nature of mindfulness on both theoretical and operational levels (Hayes & Wilson, 2003). Mindfulness has been defined as a self-regulatory capacity (Brown & Ryan, 2003), an acceptance skill (Linehan, 1993), and a meta-cognitive skill (Bishop et al., 2004). The extant measures of mindfulness also reflect a diversity of definitions, with self-report scales ranging in complexity from one factor (Brown & Ryan, 2003; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006) to five (Baer et al., 2006). For this thesis, Mindfulness has been defined as: ‘The awareness that emerges through paying attention; on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment’ (Kabat-Zinn, 2003, pg. 145). This definition will be reflected in each of this PhD’s study designs. This definition of mindfulness was chosen due to the precision of its language, its succinctness in description, and the fact that it is the most consistently used definition across the mindfulness literature. The use of this definition will thus allow greater comparability between the studies in this PhD and the wider literature.

#### 2.1.1 Mindfulness origins: connections between the east and west

Recognition of the common goal that Buddhism, medicine and psychology each have in reducing suffering has helped to pave the way for the entry of mindfulness and Buddhist meditative exercises into western medicine and psychotherapeutic programmes (Carmody, 2015). The concept of mindfulness is most

firmly rooted in Buddhist psychology (Gunaratana, 2002; Thera, 1992), where it occupies a central place in a system designed to lead to the cessation of mental suffering (Thera, 1992). These forms of meditation are derived from the earliest Buddhist scriptures and are known as insight meditation (Vipassana in the original Pali) (Carmody, Baer, Lykins, & Olendzki, 2009). In that context, mindfulness is a way of employing attention to afford the practitioner insight into the impermanent nature of the personal self, through the recognition of conditioned chains of mental processes and the attendant woes that follow from these (Carmody et al., 2009). Although mindfulness practice is at the heart of ancient Buddhist traditions, and as such has been practiced, analyzed, and debated for centuries, it is only within the last three decades that mindfulness has received significant attention in the medical and psychological literatures (Carlson, 2015; Baer, 2003).

The use of Buddhist ‘mindfulness’ practices in the context of western clinical psychotherapy emerged in the 1980s and early 1990s (Gethin, 2011). The introduction of mindfulness to the westernized world is associated with Jon Kabat-Zinn and his work at the Stress Reduction Clinic (founded in 1979) and Center for Mindfulness in Medicine, Health Care, and Society (founded 1995) at the University of Massachusetts (Grossman et al., 2004). It is here that he developed ‘mindfulness-based stress reduction’ (MBSR) (Grossman et al., 2004). The direct Buddhist influences on Kabat-Zinn’s approach to MBSR are clear from a number of his writings: certainly the tradition of Vipassana insight and mindfulness meditation is one of the major influences, although he also cites other Buddhist meditation practices (Gethin, 2011). Since the 2000s, MBSR and later Mindfulness-based Cognitive Therapy (MBCT) (which is also derived from ancient Buddhist meditative teachings)

(Segal, Williams, & Teasdale, 2002) have seen an exponential research growth trajectory in the fields of psychology, psychiatry, medicine and neuroscience (Grossman et al., 2004).

Increasingly the research literature on mindfulness has started to explore the synergies between Buddhist models and cognitive science (Grabovac et al., 2011; Teasdale & Chaskalson, 2011). This has led to more traditionally oriented Buddhist psychological constructs finding their way into the ongoing challenge to better understand, define and operationalize mindfulness (Ohlsson, 2014). The emergence within science and medicine of interest in Buddhist meditative practices and their potential applications represents a convergence of two different ways of knowing, that of Western empirical science, and that of the empiricism of the meditative or consciousness disciplines and their attendant frameworks, developed over millennia (Williams & Kabat-Zinn, 2011). How one views the adaptation of Buddhist mindfulness practice to a modern clinical context for the treatment of stress, anxiety and depression will depend on one's particular perspective. For traditional Buddhists, the abstraction of mindfulness from its context within a broad range of Buddhist meditative practices might seem like an appropriation and distortion of traditional Buddhism that loses sight of the Buddhist goal of rooting out greed, hatred and delusion (Gethin, 2011). For more modern Buddhists, abstracting mindfulness in such a manner might strip it of unnecessary historical and cultural baggage, focusing on what is essential and useful (Gethin, 2011; Ohlsson, 2014). Mainstream psychology would certainly appear to be better served by engaging in a more open, but nonetheless critical and rigorous, examination of the wider issues and implications of Buddhist psychology (Chambers et al., 2009).



De Silva (1990) argues that a complete integration of Buddhist and western psychology is not likely to be possible or desirable. However, the adherence of both to empiricism and restriction to clearly testable hypotheses suggests that some aspects of Buddhist psychology may be assimilated (De Silva, 1990). Operationalization of Buddhist concepts of mindfulness into existing mainstream psychological models could have benefits for the treatment of an ever-increasing range of psychological problems (Chiesa et al., 2014; Williams & Kabat-Zinn, 2011). Thus, a more open-minded examination of and dialogue with Buddhist psychology may be able to inform the way we understand human psychological functioning and ways in which to ameliorate human distress (Chambers et al., 2009). Research that seeks to separate essential and nonessential ingredients of mindfulness is likely to have its task simplified by seeking close guidance from the centuries-old meaning of mindfulness that is exhaustively described in the scholarly literature (Brown, Ryan, & Creswell, 2007). Research of this nature is likely to aid the advancement of the science of mindfulness (Brown et al., 2007).

### 2.1.2 Mindfulness-based Cognitive Therapy (MBCT)

Internationally, the most renowned clinical MBI is MBCT (Segal et al., 2002). MBCT, derived from mindfulness-based stress reduction, is an evidence-based 8-week systematic psychotherapeutic intervention that integrates selected elements of cognitive behavioral therapy for depression (Beck, Rush, Shaw, & Emery, 1979), with the clinical application of mindfulness meditation (Segal et al., 2002). MBCT is based on Theravadan Buddhism, and theoretical and empirical work demonstrating that depressive relapse is associated with the reinstatement of automatic modes of thinking, feeling and behaving that are counter-productive in contributing to and

maintaining depressive relapse and recurrence (e.g., self-critical thinking and avoidance) (Lau, Segal, & Williams, 2004). The defining points of contact between MBCT and the Theravada are: (1) their shared understanding of how mindfulness counteracts unconscious, habitual ways of thinking and responding; (2) the fact that they deal and are concerned with the same material: human suffering and ways to relieve suffering; (3) they share a pragmatic, self-reliant approach to life that recognizes the great value of acceptance and compassion (Batchelor, 2011; Gilpin, 2008).

MBCT's primary teaching vehicle is experiential learning through mindfulness practice (Fennell & Segal, 2011). MBCT demonstrates a pragmatic and liberal attitude towards adapting meditation techniques from a variety of sources, and utilising these for its particular ends. Such an attitude is quite consistent with the flexible, unconventional approach of MBCT's Vipassana Sangha influences (Gilpin, 2008). MBCT is led by a facilitator, who teaches the different meditative techniques, and then assigns individual daily homework in between sessions (Segal et al., 2002). In the earlier sessions of MBCT, intentional attention is learned using a range of core mindfulness practices (the body scan, mindful movement and mindfulness of the breath) (Edwards, Bryning, & Crane, 2015; Feldman & Kuyken, 2011; Segal et al., 2002; Williams & Kuyken, 2012). As well as developing attention, these early sessions highlight habitual patterns of reactivity that arise during meditation (e.g., intrusive negative thoughts) and the associated aversion and judgments (e.g., "I am not good at this, I am just more aware of how badly I feel") (Feldman & Kuyken, 2011). It is here that participants tend to become more aware of their primary appraisal tendencies (Lazarus & Folkman, 1984), e.g., if a person struggles to meditate, they

may find it stressful as this struggle may be accompanied by self-critical thoughts. As participants become more proficient in the use of their mindfulness skills and practices, they are taught to become more approach coping oriented (Moos, 2002). Participants are thought to turn towards distressing thoughts and feelings and hold such experiences in awareness. They are also thought to relate non-judgmentally to the change and flux of thoughts, emotions and bodily sensations, including intense bodily sensations and emotional discomfort and cultivate acceptance and self-compassion towards these stimuli (Feldman & Kuyken, 2011; Segal et al., 2002; Van der Velden et al., 2015). This allows positive reappraisal to occur (Lazarus & Folkman, 1984) and the breaking up of associative networks by becoming aware of, and stepping out of habitual unhelpful negative patterns of thinking (characterized by negative and ruminative thinking), offsetting the risk of depressive symptoms (Feldman & Kuyken, 2011; Segal et al., 2002; Van der Velden et al., 2015). In addition, MBCT contains elements from cognitive behavioral therapy (CBT) such as psycho-education about the role of cognition in depression, and exercises to illustrate the interrelatedness of thoughts, emotions, behavior and physiology in inducing and maintaining depressive symptoms (Segal et al., 2002). The combination of practices to cultivate mindfulness skills and CBT elements are thought to increasingly enable participants to recognize the automatic activation of habitual dysfunctional cognitive processes such as a negative appraisal (Lazarus & Folkman, 1984; Van der Velden et al., 2015). These processes can lead to depressogenic rumination, and MBCT participants are thought to decentre and disengage from these dysfunctional processes using their newly attained mindfulness skills (Van der Velden et al., 2015).

Since the first edition of the MBCT manual was published in 2002, there has been a mounting interest in MBCT and its clinical potential in the prophylactic treatment of depressive disorders (Van der Velden et al., 2015; Williams & Kuyken, 2012). Thus far, the literature (which has methodological issues which will be discussed later in this chapter in section 2.2) supports the effectiveness of MBCT (Edwards et al., 2015). The growing importance of mindfulness is, as articulated by many mindfulness researchers, in part, fueled by the empirically supported, clinical effectiveness of MBIs in dealing with a large variety of acute and chronic physical and psychological disorders (Baer, 2003; Chiesa & Serretti, 2009; Kabat-Zinn, 2013; Keng et al., 2011; Ohlsson, 2014). Meta-analyses have found that mindfulness interventions have positive effects on mental health issues such as anxiety, depression and wellbeing with a range of clinical and non-clinical samples across age groups (Grossman et al., 2004, Hofmann, Sawyer, Witt, & Oh, 2010; Ludwig & Kabat-Zinn, 2008). This literature has typically found that MBCT has a small to medium effect on wellbeing (Bolier et al., 2013; Pots et al., 2014), anxiety (Bohlmeijer et al., 2010; Goyal et al., 2014; Hofman et al., 2010; Pots et al., 2014) and depression (Bohlmeijer et al., 2010; Bolier et al., 2013; Goyal et al., 2014; Hofman et al., 2010; Pots et al., 2014). Researchers hypothesize that its effectiveness for so many different types of conditions is due to its ability to modulate the stress response and improve health, mental health and wellbeing through the following: more benign appraisal of pain, increased ability to tolerate pain, reduced stress, more social connection and enriched interpersonal relationships (Chiesa & Serretti, 2010; Keng et al., 2011; Ohlsson, 2014; Ruff & MacKenzie, 2009).

### 2.1.3 Mindfulness and psoriasis

Given the levels of distress outlined in the previous chapter, in order to support the biopsychosocial adjustment of psoriasis patients, a single, relatively brief and cost effective programme that can potentially meet the physical and psychological needs of psoriasis patients should be of great interest (Grossman et al., 2004). Stress is thought to exacerbate psoriasis, and vice versa with the bi-directionality of these interactions, in turn, exacerbating levels of depression and anxiety in the patient (Chapman & Moynihan, 2009). Teaching patients how to relate differently to and reduce stress may help to dampen this cycle and the body's inflammatory response, thereby reducing the resultant anxiety and depression and improving psychological wellbeing in psoriasis patients (Fordham, Griffiths, & Bundy, 2015). However, even if the salutary effects of mindfulness-based interventions are widely accepted and their effectiveness has been demonstrated in a number of studies (in the context of a literature with methodological weaknesses outlined in section 2.2 below), research on its use with psoriasis patients is scant.

Only 3 RCT studies published on the use of mindfulness with psoriasis patients are currently available. Kabat-Zinn (1998) in an RCT recruited 37 adult patients with moderate to severe psoriasis (covering >15% of the body surface) who were candidates for treatment with phototherapy (UVB) or photochemotherapy (PUVA). Participants were randomly allocated into two groups: one group (meditators) followed guided mindfulness meditation instructions delivered by audio-tape during their ultraviolet (UV) treatments (either PUVA or UVB) on a 3-times-per-week protocol, while the other group received UVB or PUVA treatments alone (Kabat-Zinn et al., 1998). Patients who were meditating reached skin clearance significantly more rapidly than the control group, clearing at about four times the rate

of subjects who received the UVB or PUVA. The average time to clearance of lesions with UVB for MBSR subjects was 83 days compared to 113 for the controls, and for PUVA, 48 days for the MBSR subjects, compared to 85 days for the controls (Kabat-Zinn et al., 1998). Fordham et al. (2015) conducted a small-scale pilot RCT ( $N = 29$ ) on the impact of an 8-week MBCT course versus treatment as usual (TAU) on perceived stress, anxiety, depression, QoL and psoriasis severity. Fordham et al. (2015) found that the MBCT group reported a significant improvement in both psoriasis severity and quality of life. They did not find significant changes in anxiety or depression. Fordham et al. (2015) identified that this may be due to the small sample size, the small numbers of patients who completed the intervention ( $N = 19$ ; 6 in intervention and 13 in the control group), or the low levels of anxiety and depression existing within the study population, demonstrating a floor effect. A recent addition to the literature on the use of mindfulness interventions with psoriasis patients came from D'Alton et al. (2018). This study employed an RCT design to determine the comparative efficacy of MBCT, Mindfulness-based Self-Compassion therapy (MBSCT), and self-help MBSCT (MBSCT-SH) relative to treatment-as-usual (TAU) in improving the long-term psychological (anxiety, depression, QoL, psychological wellbeing, worry and self-compassion) and physical outcomes of individuals with psoriasis. Ninety-four adults with mild to moderate psoriasis were randomly assigned to TAU ( $N = 22$ ) or TAU combined with MBCT ( $N = 25$ ), MBSCT ( $N = 25$ ), or MBSCT-SH ( $N = 22$ ). This study found no statistically significant differences on the effects of the MBIs on psychological wellbeing, anxiety, depression, psoriasis symptoms, quality of life, worry, mindfulness or self-compassion relative to TAU alone at post-treatment, 6- or 12-month follow-up. The authors identified floor effects as being a potential factor in the inefficacy of the MBIs

in this study. The sample in this study had mild-to-moderate severity of psoriasis in the intervention groups at baseline. The sample means on measures of anxiety, depression (measured by the Hospital Anxiety and Depression Scales; Zigmond & Snaith, 1983), and worry (measured by the Penn State Worry Questionnaire; Meyer et al., 1990) were also identified as being within the normal range for the measures they used; thus participants with low baseline scores had little room for improvement. The authors also identified that the non-significant findings in this study may have been due to the fact that the self-report measures that they used to measure the outcomes may have been insensitive. As highlighted earlier, the literature on MBCT has typically found that MBCT has a small to medium effect on anxiety, depression and wellbeing. D'Alton et al. (2018)'s study was sufficiently powered to detect medium effects. Therefore a lack of statistical power in D'Alton et al. (2018), may also have been a factor in why this study failed to detect small but significant effects of these MBIs on the psoriasis symptoms, anxiety, depression and psychological wellbeing of psoriasis patients relative to the control group. The mixed results of these studies indicate that it is still unclear if MBIs are effective or not at improving the psoriasis symptoms, anxiety, depression and psychological wellbeing of psoriasis patients. Thus, further research using RCT designs is clearly needed.

#### 2.1.4 Cost-effectiveness of MBCT

MBCT has potential cost advantages over many existing treatments, especially for treating mental health issues. Unlike most psychological therapies, interventions are delivered to groups rather than one-to-one, and thus require less therapist time per patient. Two studies (Ma & Teasdale, 2004; Teasdale et al., 2000) respectively reported that MBCT on average required less than 3 and 5 therapist contact hours per

patient. Unlike much medication, which may require continued prescription, MBCT courses are time-limited: once the techniques have been taught, they can continue to be practiced without further input from a therapist (although follow-up booster sessions may be useful) (Piet & Hougaard, 2011). Considering the costs of delivering an MBI (i.e, instructor hourly fee plus overhead for room space, materials, registration, zero diagnostic or technology costs) this averages out at approximately \$3 per contact hour per patient (Piet & Hougaard, 2011). Kuyken et al. (2008) in a sufficiently powered RCT found the estimated annual per-patient total costs for the first 15 months of \$2767 and \$2340 for the MBCT and maintenance anti-depressant (m-ADM) conditions respectively (difference not significant). The incremental cost-effectiveness ratio for MBCT was estimated to be \$962 per prevented relapse/recurrence, and \$50 per depression-free day. MBCT was less expensive than m-ADM for the last three of the 15 months, perhaps indicating a more favorable cost-effectiveness of MBCT in the long run (Piet & Hougaard, 2011). This suggests that the additional cost of MBCT may be justified in terms of improvements in the proportion of patients who relapse—but only if willingness to pay for such improvements is \$1,000 or above (Kuyken et al., 2008).

## 2.2 Issues in mindfulness research thus far

Due to the consistent failing of the popular media to accurately represent the scientific examination of mindfulness, there appears to be a common misperception in public and government domains that compelling clinical evidence exists for the broad and strong efficacy of mindfulness as a therapeutic intervention (Freeman & Freeman, 2015; Gunderson, 2016). Numerous intervention studies have been conducted to assess whether, and by how much, practicing mindfulness may help alleviate various



mental and physical health conditions, including pain, stress, anxiety, depression, obesity, addiction, and others (Van Dam et al., 2018). Methodological limitations exist in this literature however, which limit the extent to which it can be said that compelling evidence of the efficacy of mindfulness as an intervention exist (Van Dam et al., 2018). These include a lack of RCTs, the RCTs studies that do exist having small sample sizes, studies with no control groups or control groups mainly made up of university students. The mechanistic details of the change process in MBIs also remain poorly understood and there has been scant qualitative research on what patients feel were the mechanisms by which their psychological and physical health improved (Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011; Grossman et al., 2004; Szekeres & Wertheim, 2014). On balance, much more research will be needed before it can be known for what mental and physical disorders, in which individuals, MBIs are helpful. Given the absence of scientific rigor in clinical mindfulness research (Davidson & Kaszniak, 2015; Goyal et al., 2014), evidence for use of MBIs in clinical contexts should be considered preliminary (Van Dam et al., 2018).

### 2.2.1 Mindfulness – unclear mechanisms of action

The change process involved with mindfulness is a complex one and it remains unclear what the underlying mechanisms are (Montgomery et al., 2016; Ohlsson, 2014). Reviews of mindfulness interventions have provided partial preliminary evidence for a variety of mechanisms that mediate the effectiveness of mindfulness interventions on mental health outcomes and well-being including cognitive and emotional reactivity (Gu et al., 2015; Raes, Dewulf, Van Heeringen, & Williams, 2009), self-compassion (Neff, 2003), increased acceptance (Keng et al., 2011) mindfulness (Kuyken et al., 2010), defusion (Fletcher & Hayes, 2005),

decreased rumination (Chiesa, Anselmi, & Serretti, 2014; Gu et al., 2015; Keng et al., 2011; Shahar, Britton, Sbarra, Figueredo, & Bootzin, 2010), attention, and emotion regulation, insight, exposure, and nonattachment (Baer, 2003; Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006; Shapiro et al., 2006), negative emotions (Chiesa et al., 2014; Keng et al., 2011), experiential avoidance (Chiesa et al., 2014), worry (Gu et al., 2015), positive emotion regulation strategies (Chiesa et al., 2014; Velotti, Garofalo, & Bizzi, 2015) better attention regulation (Van Aalderen, Donders, Giommi, & Speckens, 2012), decentering (Carmody et al., 2009), self-compassion (Baer et al., 2006; Keng et al., 2011; Kuyken et al., 2010), improved meta-awareness (Hargus, Crane, Barnhofer, & Williams, 2010; Teasdale et al., 2002), acting with awareness, describing, nonreacting, and nonjudging reported greater psychological well being (Baer et al., 2008), fewer psychological symptoms and emotion regulation difficulties, and lower levels of experiential avoidance, thought suppression, neuroticism, and alexithymia (Baer et al., 2006).

Van der Velden et al. (2015) systematically reviewed 23 studies examining the mechanisms of action of MBCT in the treatment of recurrent major depressive disorder. 12 studies found that alterations in mindfulness, rumination, attention regulation/decentering, worry, self-compassion, or meta-awareness were associated with, predicted or mediated MBCT's effect on treatment outcome. In addition, preliminary studies indicated that alterations in attention, memory specificity, self-discrepancy, emotional reactivity and momentary positive and negative affect might play a role in how MBCT exerts its clinical effects (Van der Velden et al., 2015). Most of the reviewed mediation studies above have the same key methodological shortcomings already articulated in section 2.2, which preclude robust conclusions

regarding mediation. However, they provide groundwork on which future studies could be built (Gu et al., 2015).

Mindfulness training may entail multiple mechanisms that vary with different clinical populations. Knowing how and when to apply variations that are consistent with the core of mindfulness training is in line with evidence-based treatment in other forms of therapy (i.e., finding out which forms and types of therapy work for which individuals under what circumstances; Paul 1967). Thus, more work is needed to ascertain which variations in which mechanisms are most effective for which groups under what circumstances (Van Dam et al., 2014). Understanding how and why mindfulness interventions can effectively improve the anxiety, depression and wellbeing of psoriasis patients is essential both for theoretical and clinical reasons (Svendsen et al., 2017; Van der Velden et al., 2015; Kazdin, 2007). By identifying the mechanisms of action in MBIs and enhancing the theoretical understanding of how this treatment may work, MBIs' therapeutic effects can be optimized through: the enhancement of the active components of interventions (enhancing efficacy through these mechanisms), distinguishing between the specific and broader, non-specific effects of treatment, facilitating the identification of treatment moderators and mediators and improving the accuracy of matching of therapies to patients that will benefit from the treatment (Kazdin, 2007; Svendsen et al., 2017; Van der Velden et al., 2015). Studying the mechanisms of therapeutic change in mindfulness might reveal any shared variance between potential mediators and contribute to a better understanding of possible causal relationships in the processes that mediate between mindfulness and mental health outcomes (Svendsen et al., 2017; van der Velden et al., 2015). Some of the components of mindfulness may influence psychological distress

only indirectly, through their influence on other variables such as worry or rumination, while others may exert both direct and indirect influences on psychological distress (Hayes-Skelton & Wadsworth, 2015; Shapiro & Jazeiri, 2015). Thus more studies are required to measure training-related change mechanisms, their relationships to one another, and how these relationships achieve a therapeutic benefit for patients (Hayes-Skelton & Wadsworth, 2015; Shapiro & Jazeiri, 2015).

### 2.3 Mindfulness mechanisms of action models

In addition to the specific theoretical model behind MBCT, a number of other theoretical models have been developed suggesting trans-diagnostic and trans-interventional change mechanisms underlying MBIs (Ohlsson, 2014; Van der Velden et al., 2015). Bishop et al. (2004) initially described a component model in which mindfulness was seen as consisting of self-regulated attention, characterized by an open and accepting attitude. This initial model was followed by Shapiro et al. (2006)'s intention, attention and attitude model. This model posits that mindfulness arises from the simultaneous cultivation of three components: (a) clear intention as to why one is practicing, such as for self-regulation, self-exploration, or self-liberation; (b) an attention characterized by the observation of one's moment-to-moment experience without interpretation, elaboration, or analysis; and (c) a quality of attending characterized by an attitude of acceptance, kindness, compassion, openness, patience, nonstriving, equanimity, curiosity, and non-evaluation. Shapiro et al. (2006) proposed that cultivating mindfulness facilitates a change in relation to perceived mental and emotional experiences, which they term *reperceiving*, more commonly referred to as *decentering* (Shapiro et al., 2006). Several other authors have supported this theory, suggesting that mindfulness training increases metacognitive awareness, or the

capacity to decenter, enabling people to distance and dis-identify themselves from the contents of their conscious thoughts and emotions (Bieling et al., 2012; Hargus et al., 2010; Safran & Segal, 1990; Segal et al., 2002; Shapiro et al., 2006; Teasdale et al., 2003). By decentering a meditator gains a sense of mastery over their thoughts and emotions, and feel able to perceive them as transient mental events, rather than to identify with them or to believe that thoughts and emotions are accurate reflections of the self or the reality (Chambers et al., 2009; Gecht et al., 2014; Safran & Segal, 1990; Shapiro et al., 2006; Teasdale et al., 2000). It has been suggested that a decentered perspective increases the range and adaptability of responses to both a stimulus cue and one's impulse to react to that cue. Consequently, situational cues and responses can be addressed more consciously rather than to merely react to them in terms of habit or overlearned responses (Brown et al., 2007; Chambers et al., 2009; Shapiro et al., 2006). Decentering, then, is proposed to mediate the effect of mindfulness on subsequent mechanisms, e.g., values clarification or cognitive, emotional, and behavioral flexibility, which finally result in health benefits or may also be regarded as outcomes in themselves (Shapiro et al., 2006). Hölzel et al.'s (2011) theoretical review integrated neuroscientific findings with self-report and experimental data to propose four mechanisms through which mindfulness works: 1) attention regulation, 2) body awareness, 3) emotion regulation, and 4) change in perspective on a 'static' self. Brown et al. (2007) also describe several processes underlying the therapeutic effects of mindfulness, including insight, exposure, nonattachment, enhanced mind-body functioning and integrated functioning. Similarly, Baer (2003) identified exposure, cognitive change, self-management, relaxation and acceptance as key mechanisms (Gu et al., 2015).

The range of potential models and mechanisms of action of mindfulness across the literature highlights the considerable debate in scientific circles over what the potential therapeutic mechanisms of action might be (Van der Velden et al., 2015). This debate has not been settled due to the lack of studies, which have rigorously tested potential models of mindfulness, which might causally connect how mindfulness variables may impact on psychological outcomes such as anxiety, depression and wellbeing (Gu et al., 2015). Mindfulness represents a rich and complex phenomenon, and the development of testable theories are important to the advancement of our understanding of how mindfulness-based interventions lead to beneficial outcomes in clinical settings (Van der Velden et al., 2015). One such promising integrative testable model comes from Grabovac, Lau and Willett's (2011) Buddhist Psychological Model (BPM). In an attempt to address the lack of clarity in the understanding of the mechanistic change processes in mindfulness interventions, Grabovac et al. (2011) proposed a psychological model derived from Buddhist contemplative traditions. This model expands the construct by including, the often omitted, Buddhist psychological theories (Gu et al., 2015; Ohlsson, 2014). Grabovac et al. (2011) use the BPM to describe what is occurring during mindfulness practice and identify specific mechanisms through which mindfulness and self-regulation practices may result in symptom reduction as well as improvements in wellbeing. The BPM provides clarity regarding the components comprising attention regulation and mindfulness practices that may permit more precise component analysis studies of MBIs. In order to advance our understanding of how mindfulness-based interventions lead to beneficial outcomes in psoriasis patients specifically, this thesis will use a clinically modified BPM based on Grabovac et al. (2011) to attain a greater understanding of the rich and complex phenomena that occurs during mindfulness

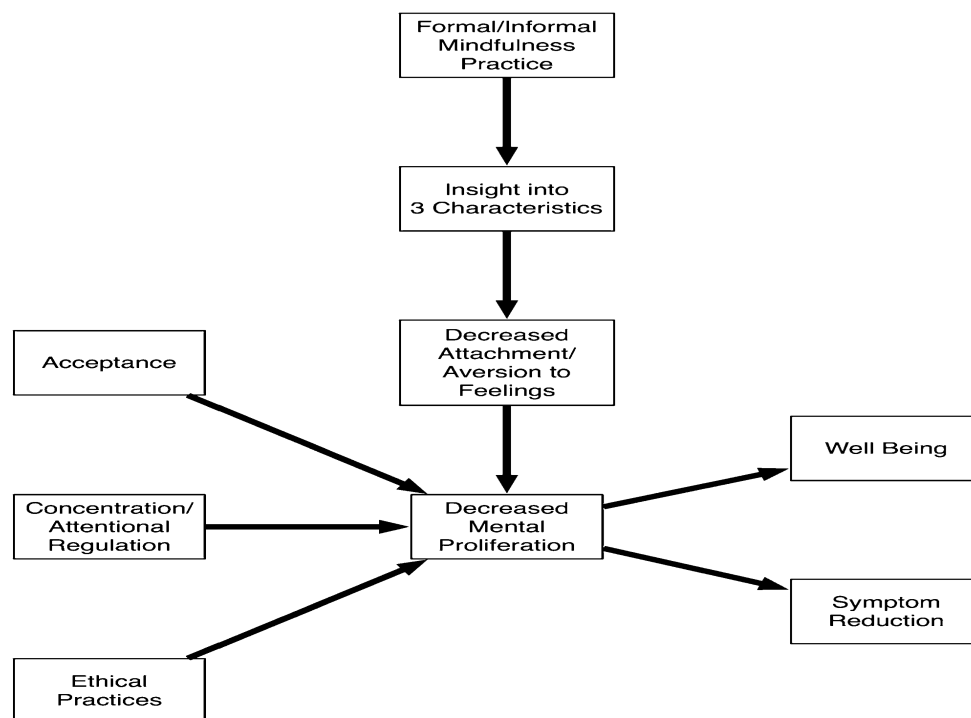
training. Such research would provide data useful to clinicians for optimizing MBIs for psoriasis patients since they would be able to quantify the relative contributions of acceptance, aversion, attachment, attention regulation, mindfulness and self-compassion on wellbeing and symptom reduction (Grabovac et al., 2011). The rest of this chapter will focus on the theory of the BPM along with the western theoretical literature on each of the variables contained within the clinical modified BPM, before setting out the aims and objectives of this thesis.

### 2.3.1 Buddhist Psychological Model (BPM)

Grabovac et al. (2011) identified that many of the techniques used in MBIs have been adapted from Buddhist contemplative traditions. However, for the most part, the psychological model that accompanies these techniques has not been explicitly incorporated into the theory or implementation of MBIs, nor into current mechanistic models of MBIs. This has resulted in an unnecessary loss of the context that might explain how these techniques work and why they are used (Grossman, 2010). The BPM is based on commentaries on, and translations of, a set of Buddhist texts called the Abhidhamma Pitaka (Philosophical Collection; Mendis 2006; Narada Maha Thera, 1987). Grabovac et al. (2011) proposed the BPM to describe what occurs during mindfulness practice and identify specific mechanisms through which mindfulness practices may result in symptom reduction as well as improvements in wellbeing.

A simplified summary of the BPM, outlined in Figure 2-1 below, shows how the flow of events encompasses three main areas. Firstly, by engaging in regular (I) mindful and accepting meditative practice, the participant develops an improved

ability for attentional regulation and a greater accepting quality of awareness towards emotional content (thoughts, feeling and emotions). This involves a deepened understanding into the transience of the concept of the self and the temporary nature of the constant flow of consciousness, thus insight. Secondly, this attentional awareness brings less need of emotional control, clinging and mental fixation and thereby reduced rumination, which in summary, represents the main object of the BPM, (II) decreased mental proliferation. And thirdly, this overall decrease in mental proliferation, and in conjunction with a Buddhist loving, kind and ethical predisposing towards others, results in an increased sense of (III) psychological wellbeing and symptom reduction (Grabovac et al., 2011).



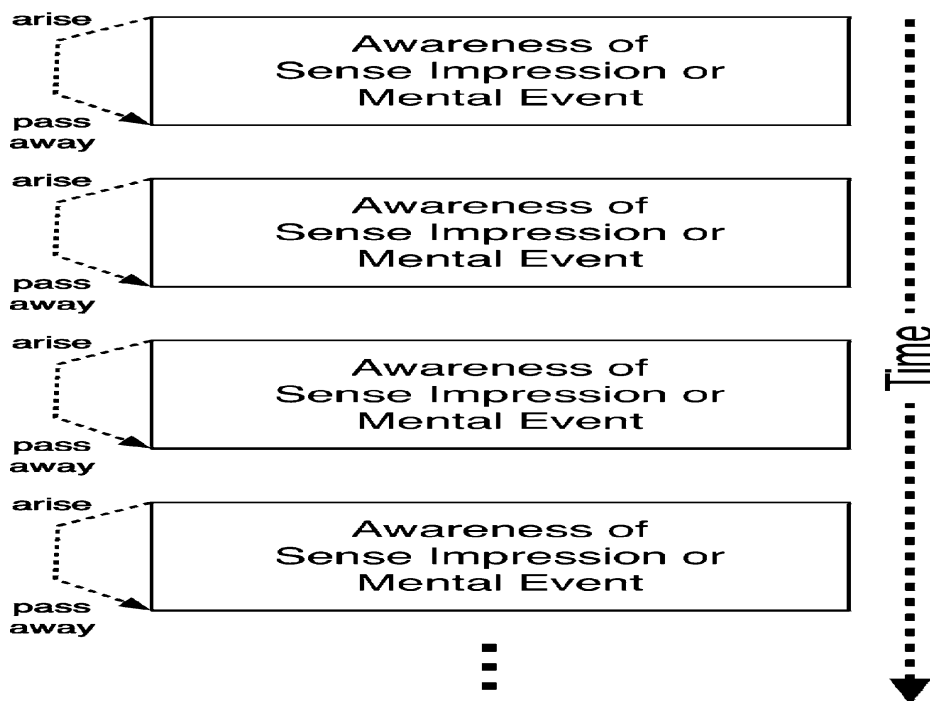
**Figure 2-1.** Buddhist psychological model.

### 2.3.2 Components of mental activity

In the BPM, awareness of an object occurs when either a stimulus enters our field of perception and makes contact with a sense organ (i.e., sense impression) or

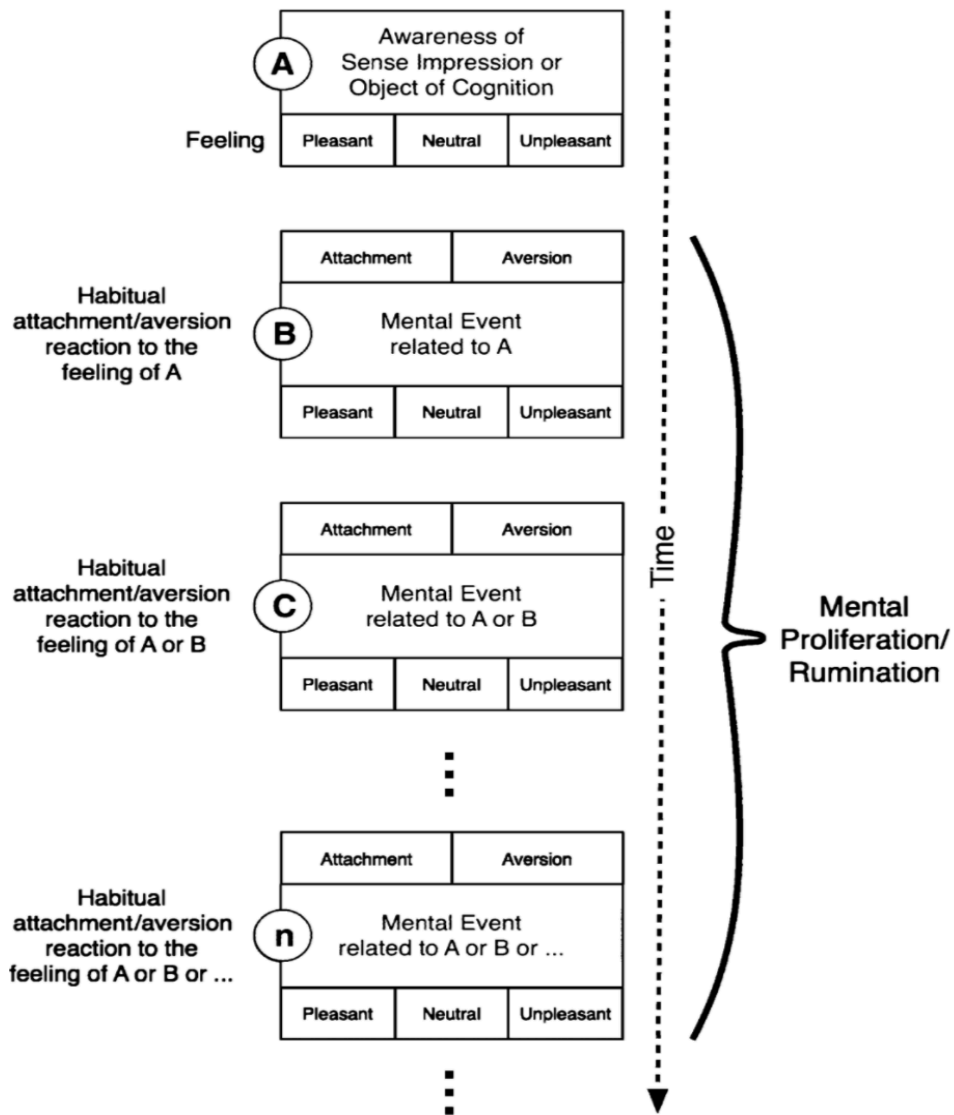


when an object of cognition (a thought, memory, emotion) arises in the mind. This awareness lasts for a brief moment in time and then ceases (see Figure 2-2 below). According to the BPM, attentional resources are limited: an individual can only be aware of one object at a time. The experience of a continuous stream of consciousness is produced by the rapid series of physical sensations and mental events arising and passing away (see Figure 2-2). This process occurs extremely quickly with dozens of discrete mental events and physical sensations occurring in a given second. With the awareness of any object, there is a concomitant feeling tone, which falls into one of three categories: pleasant, unpleasant, or neutral (neither pleasant nor unpleasant). Due to the rapid and transient nature of these feelings, constantly arising and passing away, they often go unnoticed and can serve as the key trigger to a chain reaction of thoughts (including emotions) and actions that can lead to suffering (Grabovac et al., 2011).



**Figure 2-2.** BPM moment-to-moment awareness.

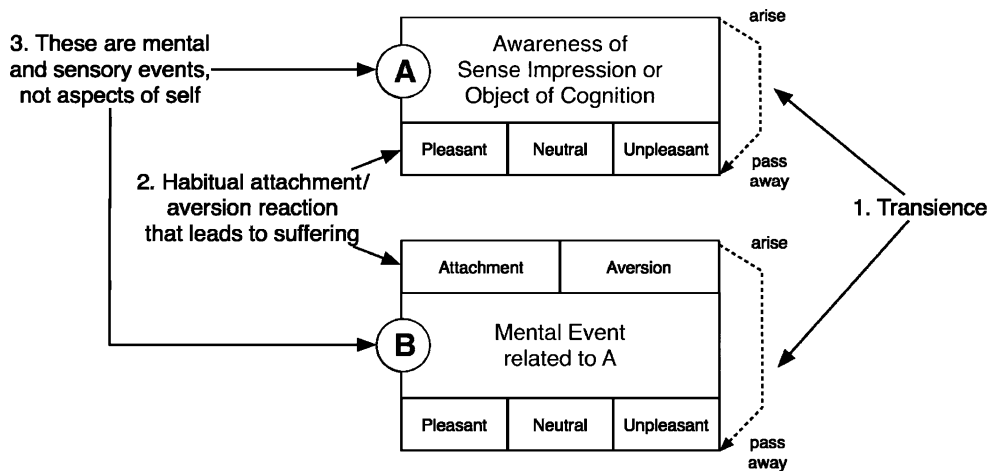
The BPM states that people's habitual reactions to feelings are to pursue those that are pleasant and to avoid those that are unpleasant. The Buddhist terms for these reactions are attachment and aversion, respectively. The main difference between the BPM and other mechanistic models of mindfulness outlined previously is the identification in the BPM of the central roles of attachment and aversion (defined as the immediate and spontaneous affective experience of the awareness of a physical sensation or object of cognition; Mendis, 2006) in the production of suffering and symptoms. These habitual reactions are expressed as mental events (thought, memory, emotion) that rapidly follow the initial sense impression (see Figure 2-3 below). This is in line with behavioral and cognitive learning theories in psychology. A commonly held assumption in these theories is that we desire (Approach), or are repulsed by (Avoid), an object of awareness. However, integral to the BPM is that attachment and aversion arise in reaction to the feeling state itself rather than to the object (Grabovac et al., 2011). The mental events (see B in Figure 2-3) that follow the initial feeling also have associated feelings (since a mental event is itself the awareness of an object of cognition and thus is accompanied by an inseparable concomitant feeling). Further mental elaboration occurs when there is attachment or aversion to the feelings arising with the mental events themselves. This is experienced as the production of additional mental events. Mental proliferation is simply a series of these mental events that has been triggered by an initial mental event or sense impression. According to the BPM, not being aware of how this pattern of attachment and aversion can lead to mental proliferation, which helps to keep the entire process habitual (Grabovac et al., 2011).



**Figure 2-3.** Attachment/aversion to feelings creates mental proliferation.

Finally, at the crux of the BPM are three main foci of mindfulness practice that are common to all sense impressions and mental events (see Figure 2-4 below): (1) sense impressions and mental events are transient (they arise and pass away); (2) habitual reactions (i.e. attachment and aversion) to the feelings of a sense impression or mental event, and a lack of awareness of this process, lead to suffering, and (3) sense impressions and mental events do not contain or constitute any lasting, separate entity that could be called a self. These are termed the “three characteristics” in

Buddhist thought and are usually referred to as: (1) impermanence, (2) suffering, and (3) not-self (Nyanaponika 2010).



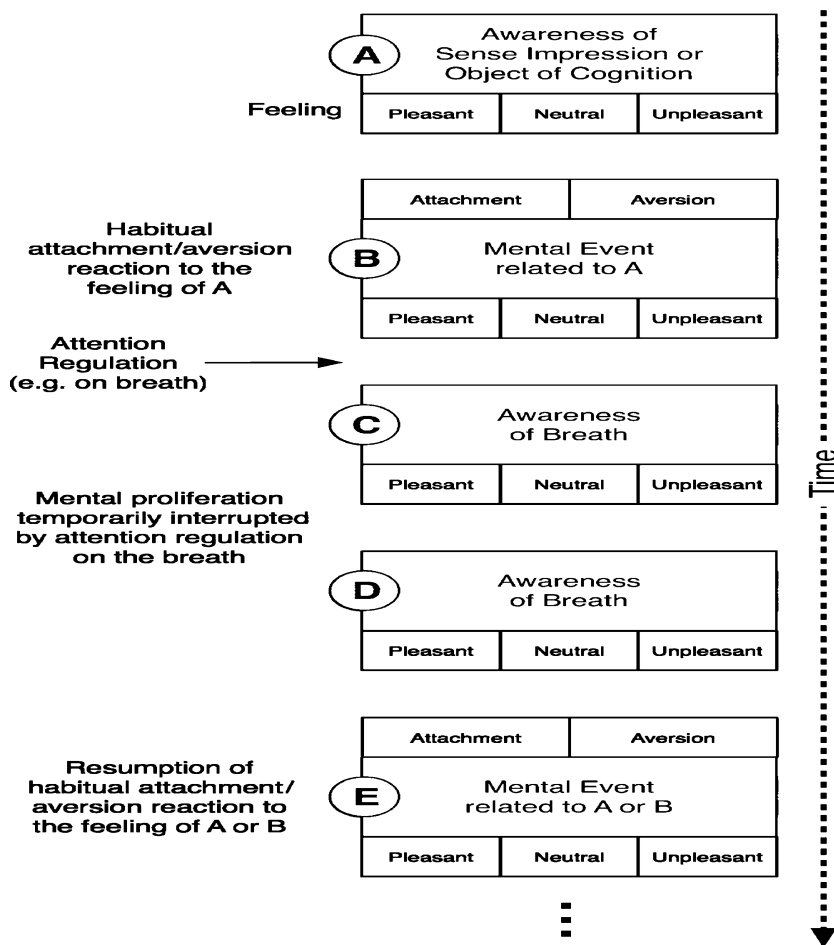
**Figure 2-4.** The three characteristics.

Although the BPM does not focus on symptom reduction (in the clinical sense), since this is not the aim of Buddhist practice, reduction in symptoms resulting from practices such as mindfulness meditation is explainable as a reduction in these habitual reactions and resulting mental proliferation. From this perspective, improvement in wellbeing occurs when sensory and mental events are allowed to naturally arise and fall away, without subsequent cognitive processing arising from either attachment or aversion. Sense impressions and mental events are still experienced as pleasant, unpleasant, or neutral; however, if there is no attachment, aversion, and thus no mental proliferation, adventitious suffering is not experienced (Grabovac et al., 2011).

### 2.3.3 Effects of attention regulation

According to the BPM, attentional resources are limited, which means that only one object can be held in awareness at a time. Thus, if attention is sufficiently

sustained on an object, the BPM posits that this prevents the awareness of other objects in that moment. Therefore, any form of attention regulation that results in sustained attention on an object has the effect of momentarily interrupting mental proliferation (see Figure 2-5 below). However, once attention lapses from the object, mental proliferation can resume, or other sense impressions or mental events can arise (Grabovac et al., 2011).



**Figure 2-5.** Process of mental proliferation being disrupted.

### 2.3.4 Effects of acceptance, compassion and ethical practices

The BPM provides an explanation for the essential role of acceptance/compassion in training both mindfulness and attention regulation. During

training, an attitude of acceptance and curiosity is brought to the repeated refocusing of attention on the chosen object. As an untrained mind is easily distracted by ruminative or narrative thought processes, attention must be refocused many times. During this repeated refocusing, an attitude of acceptance prevents negative thoughts, such as self-judgment and resultant mental proliferation, from arising and prevents the practice itself from becoming a source of aversion. Indeed, an attitude of acceptance and curiosity is a nascent form of loving-kindness, a Buddhist compassion practice that is used to gradually prevent the formation of mental states that have their origin in aversion. As practice deepens, acceptance helps relax the attention and allows rapid, discrete sensations to be more easily noticed and followed during mindfulness practice (Grabovac et al., 2011).

### 2.3.5 Effects of ethical practices

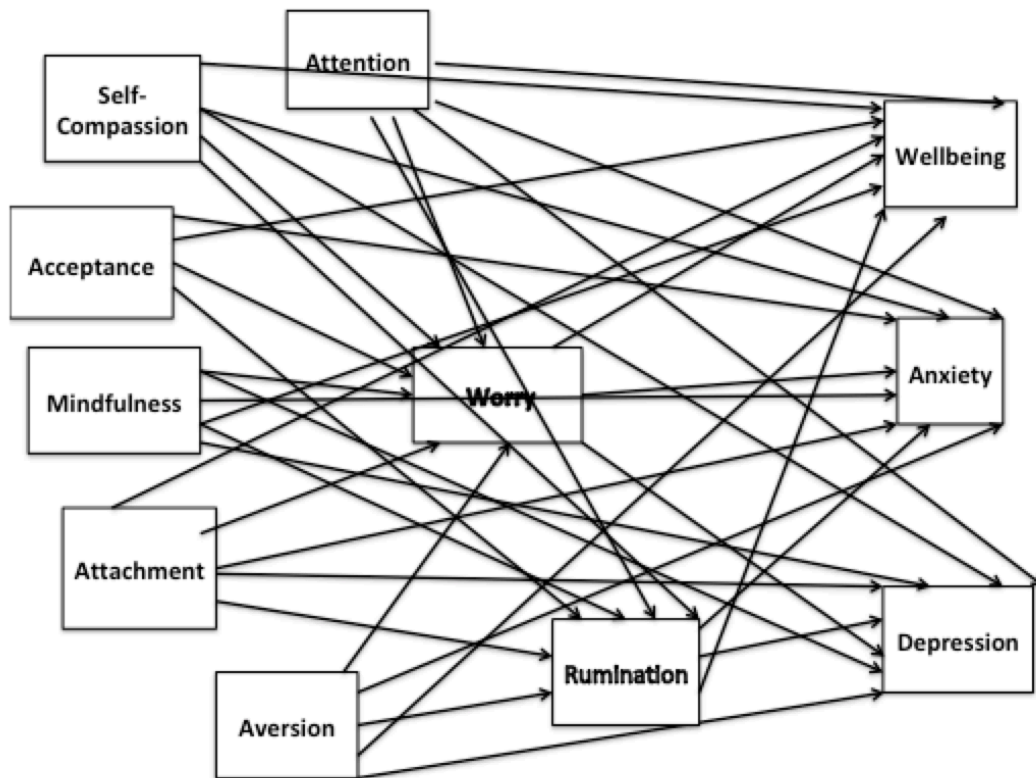
In addition to training in concentration and mindfulness, Buddhist practices prescribe a code of ethics for practitioners to follow, such as not intentionally killing, stealing, having illicit sex, lying, and using intoxicants that can cloud judgment (Thanissaro, 1997). In essence, from the perspective of the BPM, one of the major purposes of the ethical guidelines is to reduce the baseline amount of mental proliferation, thus aiding both concentration and mindfulness practices. Leading an ethical life, in the context of the BPM, implies that the meditator experiences less guilt, doubts, worries, etc. that can often be a source of mental proliferation (Grabovac et al., 2011).

## 2.4 Research supporting the BPM's conceptualisation

No one model of mindfulness or consciousness is likely to capture all the

mechanisms by which mindfulness achieves its therapeutic benefits (Gu et al., 2015). One of the potential weaknesses of the original BPM (Grabovac et al., 2011) as well as any other model, is how it may fail to account for other potentially important predictor and/or mediating variables which could potentially have an important impact on the way in which mindfulness training may impact participant wellbeing and symptom reduction. In order to potentially ameliorate this potential weakness, the domains of self-compassion and mindfulness will be tested as part of an enhanced model which will hereto for be referred to as the ‘clinically modified BPM model’ or CBPM. These domains have been added due to the promising empirical support for their utility. The ethical practices variable of the BPM will be omitted. The rationale for the inclusion and omission of these domains and literature supporting the variables in the original BPM (Grabovac et al., 2011) from a Western research and clinical perspective will now be outlined. This literature review will also outline the theoretical and limited empirical research relating to how each CBPM domain (acceptance, attention regulation, aversion, non-attachment, mindfulness and self-compassion) may impact the proposed outcome variables (wellbeing, anxiety and depression) both directly and indirectly through a mediated relationship with mental proliferation (measured as worry and rumination). The limited literature on the impact of mindfulness interventions on both the mediating and outcome variables of the CBPM will also be outlined. How the reduced use of avoidant and/or increased adoption of approach oriented stance towards thoughts and emotions (Moos, 2002) and the role that appraisal (Lazarus & Folkman, 1994) outlined in chapter 1, might impact these CBPM variables individually and relationships amongst the variables in CBPM will also be discussed in the context of the theoretical and empirical data available on each. The CBPM is outlined in Figure 2-6 below, with the CBPM

domains in boxes to the left, its mediating variables (worry and rumination representing mental proliferation as two variables) in the middle and the CBPM outcome variables in the boxes to the right.



**Figure 2-6.** Model representing the CBPM domain, mediating and outcome variables and its theorised direct and mediated relationships.

#### 2.4.1 Omission of ethical practices variable

Buddhist mindfulness is not an ethically neutral practice but requires an ethical prejudgment of what is considered wholesome/skillful and unwholesome/unskillful (Kang & Whittingham, 2010). Research on ethical practices as a potential mechanism of action in mindfulness is very limited. With this in mind, and due to the fact that the accurate measurement of Buddhist ethical practice is unlikely to be attainable from a group of psoriasis patients in a westernised medical setting, who have not undergone



mindfulness training of any sort previously, this aspect of the BPM was omitted as a potential variable of action to be measured in this thesis.

#### 2.4.2 Mindfulness

Though the research literature on mindfulness does have limitations as discussed above, it does seem clear that persons higher in mindfulness incur less stress, and experience greater subjective vitality (Brown & Ryan, 2003; Carmody & Baer, 2008; Svendsen et al., 2016). Mindfulness has been associated with lower levels of rumination, worry, thought suppression, and other negative thinking styles associated with poorer emotional outcomes (Baer et al., 2006; Shapiro et al., 2007). In promoting more approach oriented strategies for dealing with difficult thoughts and emotions (Moos, 2002), increased mindfulness may directly influence psoriasis patient depressive and anxiety symptoms and wellbeing (in line with the research outlined in section 2.5), or influence these symptoms indirectly through reduced worry and rumination, in line with the research outlined in section 2.4.7. The limited empirical research on whether increased mindfulness, as a facet of meditation, is likely lead to improved anxiety and depression is mixed. O'Doherty et al. (2015) ( $N=62$ ) used a controlled trial design with three time-points (pre-post-follow up) to evaluate the effectiveness of MBCT on people with coronary heart disease. The results from this study revealed that the MBCT group when compared to the waiting list group showed improvements for anxiety, depression and mindfulness, with these improvements in anxiety and depression being correlated significantly with the increases in mindfulness. Vøllestad et al. (2011) ( $N=66$ ) examined mindfulness as a mediator of the relationship between MBSR and improvements in anxiety, depression and worry in a randomised controlled trial for people with anxiety disorders. The

results indicated that during MBSR significant increases in mindfulness skills mediated the relationship between MBSR and anxiety and worry but not depression. Labelle, Campbell, and Carlson's (2010) in a quasi-experimental study of 77 oncology patients, using Mindful Attention Awareness scale (Brown & Ryan, 2003) also did not find that mindfulness mediated the impact of MBSR on depressive symptoms. These two results were not in line with Gu et al. (2015) who in a systematic review of 9 studies, explored the potential predictor relationship between mindfulness and depression, and found moderate, consistent evidence that mindfulness is a predictor of depression. Further research is clearly needed, and with this in mind, mindfulness was chosen as another potential predictor variable to added to the CBPM in order to identify potential mechanisms of consciousness, which may impact on wellbeing, anxiety and depression directly and/or through a mediated relationship with rumination and worry.

### 2.4.3 Self-Compassion

Self-compassion involves feelings of caring and kindness towards oneself in the face of personal suffering and involves the recognition that one's suffering, failures and inadequacies are part of the human condition (Neff, 2003a, 2003b). Self-compassion entails three fundamental components: (1) self-kindness: extending kindness and understanding to oneself rather than harsh self-criticism and judgment, (2) common humanity: seeing one's experiences as part of the larger humanity rather than as separating and isolating. The sense of common humanity central to self-compassion involves recognizing that everyone fails, makes mistakes, and gets it wrong sometimes, and (3) mindfulness: holding one's painful thoughts and feelings in balanced awareness rather than over-identifying with them (Neff, 2011; Neff, 2003a;

Neff et al., 2007; Smeets et al., 2014). Neff (2003b) proposes that the three components of self-compassion are conceptually distinct, but can also overlap and engender one another. Neff's (2003b) definition of self-compassion is similar to Kabat-Zinn's (1994) definition outlined earlier. It differs in that it is more narrowly focused on suffering and negative experiences, and refers more to a balanced perspective on experience, in contrast to the general concept of mindfulness which is more focused on and nonjudgmental awareness of any experiences (Svendsen et al., 2017; Van Dam et al., 2011). Self-compassion originates in Buddhist meditation traditions, which maintain that the regular practice of mindfulness meditation reduces suffering and cultivates positive qualities such as wellbeing, insight, wisdom, openness, equanimity, and compassion (Baer et al., 2012). Although self-compassion is not an explicit skill taught in MBCT, facilitators of MBCT often convey implicit messages about the importance of being kind and gentle with oneself (Neff & Dahm, 2015).

Self-compassion can be seen as an emotional approach coping strategy in which individuals maintain awareness of, explore, and understand their emotions (Moos, 2002; Odou & Brinker, 2014). Self-compassion may facilitate improved mood for psoriasis patients (Leary, Tate, Adams, Allen, & Hancock, 2007) and resilience by moderating their appraisals of negative events (Lazarus & Folkman, 1984; Leary et al., 2007; Smeets et al., 2014). Approaching experience with self-kindness, an understanding of the universality of suffering, and a balanced state of equipoise/equanimity may buffer people against negative events by moderating reactions to real and potential failure, such as perceived stigmatization (Leary et al., 2007; Moos, 2002; Van Dam et al., 2011). The reduction of avoidance to events that

may threaten self-esteem by engendering positive self-feelings when life goes badly may reduce psychological distress and improve wellbeing (Leary et al., 2007; Moos, 2002; Van Dam et al., 2011). When having made a mistake or feeling hurt, it is common for depressed or anxious individuals to react with self-criticism and blame (Svendsen et al., 2017). In contrast, the nonjudgmental awareness involved in mindfulness increases the chances that psoriasis patients' feelings of hurt may be allowed to enter awareness, enabling individuals to respond with self-compassion (Neff, 2003). This involves attending to the pain with an active wish to relieve the suffering (self-kindness), acknowledged through positive reappraisal (Lazarus & Folkman, 1984), that everyone experiences suffering from time to time (common humanity), and recognizing through that suffering or failing does not mean that one is a bad person (low over-identification) (Svendsen et al., 2017). In turn, a lack of self-compassion may foster an avoiding way of functioning, with people with low levels of self-compassion been found to be more likely to ruminate or worry (Krieger et al., 2013; Moos, 2002; Neff, 2003a; Neff & Vonk, 2009). Anxiety and depression can be exacerbated when one over-identifies with successes, setbacks, or failures through worry or rumination. However, the cognitive impediments of anxiety and depression can be attenuated through the cultivation of self-compassion and associated reductions in this over-identification (Leary et al., 2007; Neff et al. 2007). Thus, self-compassion may have both a direct and indirect effect on anxiety, depression and wellbeing through the increased use of self-compassion as an approach coping strategy, and the resultant reduced use of worry and rumination as an avoidant coping strategy (Borkovec, 1994; Moos, 2002; Nolan-Hoeksema, 2000).

The empirical research on self-compassion highlights that the increased self-

compassion associated with MBSR and MBCT may be a key mechanism by which these interventions improve anxiety, depression, and wellbeing (Hölzel et al., 2011; Kuyken et al., 2010). Numerous studies have found that treating oneself compassionately when confronting personal suffering promotes mental health, with one of the most consistent findings in the research literature on self-compassion being that greater self-compassion is linked to less anxiety, depression and improved wellbeing (Barnard & Curry, 2011; MacBeth & Gumley, 2012; Neff & Dahm, 2015; Pauley & McPherson, 2010; Van Dam et al., 2011). In a study of 103 chronic pain patients, Costa and Pinto-Gouveia (2011) found that increases in self-compassion predicted decreases in anxiety. Raes (2010) found in a study of 271 students found that self-compassion made a significant direct contribution to anxiety after controlling for worry and rumination. Van Dam et al. (2011) examined the link between self-compassion, mindfulness and various wellbeing measures in a large community sample of people ( $N = 504$ ) with moderate to severe anxiety and/or depression. Results indicated that individual differences in self-compassion, as compared to mindfulness, explained significantly more variance in anxiety, worry, depression, and quality of life. Similarly, Baer et al. (2012) found that self-compassion was almost twice as strong a predictor of wellbeing than mindfulness, though both were significant predictors (Neff & Dahm, 2015). Kuyken et al. (2008) found that increases in mindfulness and self-compassion both mediated the link between MBCT and depressive symptoms at 15-month follow-up among patients with three or more prior episodes of depression. They also found that MBCT reduced the link between cognitive reactivity and depressive relapse, and that increased self-compassion, but not mindfulness, mediated this association. Neff and Dahm (2015) examined the relative association of self-compassion and mindfulness with anxiety, depression,

happiness and life- satisfaction in a non-clinical community sample ( $N = 338$ ), as well as a sample of individuals practicing Buddhist meditation ( $N = 174$ ). Among the community sample, anxiety was more powerfully predicted by mindfulness than self-compassion, and depression was more powerfully predicted by self-compassion than mindfulness, though both were still significant predictors. Self-compassion was the only significant predictor of happiness and life satisfaction. Among meditators, anxiety was predicted more powerfully by self-compassion than mindfulness, with both predictors being significant. However, self-compassion was the only significant predictor of depression, happiness and life satisfaction (Neff & Dahm, 2015). While the cross-sectional nature of the data prevents any assumptions regarding the direction of causality, results suggest that increased self-compassion may be a potential mechanism of MBCT's effectiveness at improving depression, anxiety and psychological wellbeing (Pauley & McPherson, 2010). This literature indicates that understanding the processes of self-compassion and its relationship to rumination and worry is important in order to understand how MBIs may work in reducing anxiety and depressive symptoms and improving wellbeing.

#### 2.4.4 Decreased attachment and aversion

In western psychological literature, attachments are generally identified as objects or outcomes that represent important goals, that people believe they must have or achieve to be happy, such as positive experiences or avoidance of negative emotions (Coffey, Hartman, & Fredrickson, 2010; Dalai Lama & Cutler, 1998; Hanh, 1999; McIntosh, 1997). There is substantial psychological evidence that both avoidance and over-engagement/attachment to thoughts and emotions are associated with worse psychological outcomes including increases in anxiety and depression and

reductions in wellbeing (Gross, 2002; Kumar, Feldman, & Hayes, 2008; Salovey et al., 2000; Segerstrom et al., 2003). This research indicates that the extent to which a person may use strategies of aversion to regulate negative thoughts and emotions, either through thought suppression (Beevers et al., 1999; Wenzlaff & Luxton, 2003), under-engagement with internal experiences (Buchheld et al., 2002; Hayes & Feldman, 2004; Kabat-Zinn, 1990), or avoidance of emotions (Ottenbreit & Dobson, 2004) is likely to exacerbate problems related to these negative thoughts and emotions by increasing levels of worry and rumination, which may ultimately reduce wellbeing and/or increase anxiety and depressive symptoms. Psoriasis patients are most likely to ruminate or worry when important goals that they are emotionally attached to and cannot attain are blocked (Martin & Tesser, 1989; McIntosh & Martin, 1992). If a psoriasis patient is overly attached to a goal e.g., complete psoriasis clearance or fearful of being stigmatized due to the condition, a person's thoughts and behaviours may repeatedly and passively focus on one's negative mood, circumstances, and personal shortcomings, or passively worry about a negative appraisal that may not occur (Nolen-Hoeksema, 1991). This worry and rumination may maintain periods of dysphoric mood (Nolen-Hoeksema, 1998), which can predict the onset of symptoms of depression and anxiety and reductions in wellbeing (Nolen-Hoeksema, 2000). Training in mindfulness may offer an alternative response that can interrupt cycles of avoidance (Moos, 2002) and over-engagement by potentially increasing non-attachment and decreasing aversion (Segal et al., 2002; Teasdale et al., 2000). The practice of mindfulness entails an objective stance on what is occurring – for example, to witness the flow of thought, emotion, and sensation – and this likely fosters the lessening of attachment to what is inherently subject to change in daily life and, consequently, a greater capacity to abide or enjoy what is (Brown, 2015; Gu et al.,

2015). Over time, psoriasis patients may gain a high degree of introspective familiarity with their thoughts and feelings and learn to be vividly aware of mental phenomena (pleasant, unpleasant, or neutral) without mentally grasping onto them or pushing them away, or place requirements on that experience, which must be met for their happiness (Sahdra et al., 2010). Thus, the non-attached psoriasis patient may be less likely to grasp onto and seek to maintain pleasant events, e.g., complete clearance of psoriasis plaques, and experiences or to resist unpleasant ones, e.g., a psoriasis flare, and this non-attachment to the flow of events and circumstances may promote wellbeing and positive mental health (Coffey & Hartman, 2008; Sahdra et al., 2010). Decreases in aversion and attachment may also facilitate a person's willingness to experience exposure to more unpleasant stimuli, events and experiences, and this may also lead to decreased negative and increased positive cognitive appraisals of those situations, rendering lower levels of perceived stress (Lazarus & Folkman, 1984; Weinstein et al., 2009). More adaptive stress processing in this way, including more benign cognitive appraisals of stress situations and adaptive coping with stress, could then underpin decreases in anxiety, depression and increases in wellbeing (Gross & Munoz, 1995; Lazarus & Folkman, 1984; Weinstein et al., 2009).

#### 2.4.5 Acceptance

Acceptance is generally perceived as a process of fully embracing experience in any given moment – welcoming what feelings and thoughts life has presented as they are, with openness, kindness, and curiosity, fully and without defense (Baer, 2003; Hayes et al., 2013; Szabo, Long, & Villatte, 2015; Szekeres & Wertheim, 2014). In chronic conditions such as psoriasis, a belief in the invention of a curable medicine, expectation of such a cure and final disappointment at subsequent



recurrence of the disease, can all lead to intense emotional distress, and lower illness acceptance (Zalewska et al., 2007). Mindfulness approaches encourage acceptance-based coping. Through nonjudgmental observation and acceptance of emotions, thoughts, and sensations, mindfulness interventions encourage psoriasis patients to come into contact with their internal experience as opposed to attempting to avoid or control these experiences (Arch & Landy, 2015; Lynch, Lazarus, & Cheavens, 2015; Moos, 2002). With repeated mindfulness practice, psoriasis patients may develop a more accepting awareness of their thoughts and emotions (Hayes & Feldman, 2004). This may address potential problems of experiential avoidance and facilitate a healthier engagement with their emotions and experience in general (Hayes & Feldman, 2004), allowing patients to genuinely experience and express their emotions (Bridges et al., 2004) without under-engagement (e.g., experiential avoidance; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996) or over-engagement (e.g., worry; Borkovec, 1994, and rumination; Nolen-Hoeksema, 1998) with them. Thus, the voluntary exposure to and acceptance of unpleasant or challenging events and experiences such as psoriasis their psoriasis symptoms may in turn lead to decreases in emotional and cognitive reactivity e.g. worry and rumination (Borkovec, 2002; Brown et al., 2007; Felder, Zvolensky, Eifert, & Spira, 2003; Levitt et al., 2004; Sloan, 2004). Acceptance acting in this manner may also partially facilitate the assimilation and transcendence of stress in a way that may ultimately enhance the wellbeing, while reducing anxiety and depression of psoriasis patients (Shontz, 1975). In the limited empirical psychological research literature carried out thus far, greater acceptance of experience has been found to be associated with improved mental health and wellbeing outcomes. An RCT study carried out by Fledderus et al. (2010) ( $N=93$ ) that assessed an intervention based on acceptance and commitment therapy

(ACT; Hayes et al., 2006) and MBSR, found that enhancement of acceptance during the intervention mediated the effects of the intervention on the psychological wellbeing of adults with mild to moderate psychological distress. These results are in line with Lloyd and Hastings' (2008) longitudinal analysis of 91 mothers of children with intellectual disability. This study found that increased acceptance could be an important predictor of reduced anxiety. Similarly, Coffey, Hartman, and Fredrickson (2010) in a correlational study of 399 undergraduate students found that acceptance of emotional experiences were related to flourishing mental health and wellbeing. Zalewska et al. (2007) also found that acceptance of illness was the best predictor of quality of life in 100 psoriasis patients, explaining 41% of variability in results. Kostyla et al. (2013) found that there was a negative relationship between skin illness acceptance and the intensity of psychopathological symptoms (such as somatization, obsessive-compulsive disorder, interpersonal sensitivity, anxiety, depression or psychoticism) in 54 patients with psoriasis.

#### 2.4.6 Concentration/Attention Regulation

Attention is a process of focusing conscious awareness, providing heightened sensitivity to a limited range of experience and involves the direct, moment-to-moment knowing of what is happening as it is actually happening (Shapiro et al., 2006; Westen, 1996). Theorists from many schools of personality and psychotherapy have discussed the importance of observant, open awareness, and attention in the optimization of self-regulation and wellbeing (Brown & Ryan, 2003). Fortune et al. (2003a) identified a potential perpetuating factor for psychological issues in psoriasis and a potential target for psychological interventions. Psoriasis patients in this study were found to demonstrate attentional biases toward disease-specific (e.g., itching and

scratching), reactions of others (e.g., being repelled by them), and self-referential (e.g., feeling ugly) stimuli relative to controls. The processing of stress-relevant situations is a central feature in psoriasis patients' day-to-day lives and the way in which attention is brought to bear on experiences such as psoriasis flares may be important to the adaptive regulation of emotions (Weinstein et al., 2009). Deficits in attention have been shown to lead to persistent negative mood states, indicative of unsuccessful emotion regulation (Compton, 2000; Ellenbogen, Schwartzman, Stewart, & Walker, 2006), with an inability to shift attention effectively contributing toward experiencing prolonged negative affect (Wadlinger & Iacowitz, 2011). Therefore psychological interventions that remediate attentional biases may be particularly efficacious (Montgomery et al. 2016).

Mindfulness has been operationalized as a cognitive process of self-regulation of attention from a particular orientation towards one's experience (Bishop et al., 2004). All accounts of mindfulness implicate attention as a central feature; with mindfulness generally thought of as being about turning attention from thoughts about the past or the future toward the direct experience of the present moment (Tang & Posner, 2015). The quality of attention that is brought to bear on situations is thought to impact cognitive appraisals (Barnes & Lynn, 2010; Gross & Thompson, 2007; Lazarus & Folkman, 1984). One process through which attention may reduce psoriasis patient anxiety, depression and wellbeing is a reduced tendency to appraise their psoriasis in stress-inducing ways (Lazarus & Folkman, 1984; Weinstein et al., 2009). Mindfulness interventions could encourage psoriasis patients to intentionally cultivate nondiscursive, receptive decentered metacognitive attention in the face of a stressor (Creswell, 2015). By viewing the self as the observer of thoughts and internal

experiences, and thereby meta-cognitively lowering attachment and identification with cognitions, emotions may be better regulated (Chambers et al., 2009; Lynch et al., 2015). This process is described as involving a shift in cognitive sets, known as decentering (Bishop et al., 2004; Shapiro et al., 2006; Van der Velden et al., 2015). This involves a stepping back from mental experience, and the realisation that thoughts, feelings, and reactions are transitory patterns of mental activity, that they are not necessarily true representations of the self and events e.g., a psoriasis patients' self-critical thoughts are seen as thoughts and not facts (Bishop et al., 2004; Shapiro et al., 2006; Van der Velden et al., 2015). Adopting this perspective could make it possible for individuals to view their thoughts and reactions to events as arising and dissipating in the moment, without becoming engaged in sustained affective responses to them (Lebois et al., 2015). Decentering may then make it possible to approach thoughts and reactions with curiosity, openness, and acceptance – observing all reactions without efforts to change their content (Lebois et al., 2015; Moos, 2002). Regulating attention in a manner that approaches thoughts and emotions, rather than avoiding them through worry and rumination could be a critical component of the emotion regulatory process (Moos, 2002; Wadlinger & Iacowitz, 2011). This may allow the active guidance of emotion regulation processes and downstream behavior, ultimately enhancing subjective wellbeing and reducing anxiety and depression (Moos, 2002; Wadlinger & Iacowitz, 2011).

The empirical research on MBIs support the utility of mindfulness training for enhancing attentional capacities and attention-related behavioral responses (Bieling et al., 2012; Brown, 2015; Hargus et al., 2010). Bostanov, Keune, Kotchoubey, and Hautzinger (2012) found that the allocation of attentional resources among recurrently

depressed participants was increased after MBCT, and not in a waiting list control group. De Raedt et al. (2012) investigated the effect of MBCT versus no intervention on the facilitation and inhibition of attention for sad versus happy faces in a laboratory experiment with 45 patients with recurrent major depression, in a negative affective priming task. After MBCT, participants showed reduced facilitation of attention for negative information and reduced inhibition of attention for positive information, whereas the no-intervention control group showed no change in affective information facilitation. However, due to limitations to this study including a non-randomized design, evidence of key baseline differences between the two groups, and finally a lack of statistical controlling for symptom change, it is hard to disentangle the findings from self-selection bias and group differences. Bieling et al. (2012) found that an increased capacity for decentering may be fostered during MBCT, and that with practice, patients can learn to counter habitual avoidance tendencies and to regulate dysphoric affect in ways that support recovery. Hoge et al. (2015) who in an RCT that compared adapted-MBSR to stress management education in people with generalised anxiety disorders, found that a significant increase in decentering was a mediator for MBSR in relation to anxiety. It would appear that meditative practices maybe effective training methodologies in enhancing emotional wellbeing and anxiety through attentional deployment (Wadlinger & Isaacowitz, 2011). However, additional research has been advocated for to bolster these nascent findings, on how increased attention regulation capacities may impact wellbeing, anxiety and depression, within a framework of mechanisms of mindfulness such as the CBPM (Van der Velden et al., 2015).

#### 2.4.7 Mental proliferation – rumination and worry

Mental proliferation is not clearly defined by Grabovac et al. (2011) as a measurable psychological construct but it would appear to most resemble repetitive negative thinking (RNT), which is a style of repetitive thinking about negative experiences, which is difficult to disengage from and at least partly intrusive (Ehring et al., 2011). The two most common forms of RNT are rumination and worry (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002; Gu et al., 2015). Rumination is repetitive and passive thinking about one's symptoms of depression as well as the causes and consequences of those symptoms, i.e., over-identification with repetitive, non-goal-directed, negative cognitions (Sanders & Lam, 2010; Trapnell & Campbell, 1999; Nolen-Hoeksema, 1991). Rumination has been identified in both longitudinal and experimental studies as playing an important causal role in the onset, maintenance, and recurrence of depression (Kenny & Williams, 2007; Watkins, 2015). Rumination has also been associated with numerous deleterious outcomes linked to depression including prolonged and more severe negative affect, negatively biased thinking (e.g., self-criticism, pessimism, and lack of self-confidence, endorsing distorted interpretations of events and expecting negative future outcomes), poor problem solving, impaired motivation and inhibition of instrumental behavior, impaired concentration and cognition, and increased stress/problems (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky & Tkach, 2004; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008) as well as preliminary data suggesting a link to delayed recovery from major depressive disorder in cognitive-behavioral therapy (Siegle, Sagrati, & Crawford, 1999).

Several theories have been proposed to explain the negative effects of rumination. The most widely known is Nolen-Hoeksema's (2004) Response Style

Theory. This theory suggests that rumination negatively impacts individuals in four crucial ways: 1) through the activation of negative thoughts and memories, rumination exacerbates the impact of depressed mood on thinking and increases the likelihood that individuals will make depressogenic inferences in regard to their current circumstances, 2) rumination interferes with problem solving and, thus, 3) impedes the implementation of successful strategies to overcome negative mood, and 4) rumination alienates potential social supports resulting in a loss of support. Support for the Response Styles Theory has been established in the adult literature particularly the relationship between rumination and subsequent increases in depressive symptoms and onset of major depression (Hilt, McLaughlin, & Nolen-Hoeksema, 2010). In addition, rumination can prolong current depressive episodes (Nolen-Hoeksema et al., 2008).

Rumination may act as an avoidant coping strategy (Moos, 2002). Behavioural theorists have argued that rumination helps depressed individuals avoid engaging in the aversive environment that surrounds them by preoccupying their attention and time (Martell, Addis, & Jacobson, 2001), preventing the effective processing of negative emotion (Odou & Brinker, 2014; Smith & Alloy, 2009). More specifically, it may be that ruminators avoid the experience of sadness through recursive cognition (Giorgio et al., 2010), and rumination may be a manifestation of experiential avoidance (Giorgio et al., 2010; Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky, Tucker, Caldwell, & Berg, 1999).

The definition of worry most resembling RNT and mental proliferation in a BPM context is described by Borkovec, Robinson, Pruzinsky, and DePree (1983, p.

10) as: “a chain of thoughts and images, negatively affect-laden and relatively uncontrollable; it represents an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes; consequently, worry relates closely to the fear process.” Borkovec’s (1994) avoidance theory of worry postulates that worry is a predominantly verbal activity that serves to distract individuals from deeper, more emotionally arousing material. This in turn allows them to disengage from emotional pain and regain a sense of emotional and physiological control. By worrying, individuals successfully avoid aversive images, somatic anxiety, and other negative emotions (Borkovec, 1994). This avoidance of emotionally arousing material through worry then provides a false, and reinforcing, sense of control over emotions, which ultimately prevents the individual from effectively processing their negative emotion, thus preventing the extinction of fear (Borkovec, 1994). Worry helps individuals feel that they have anticipated possible threats and taken action against them. As these threats are unlikely to occur, worry is reinforced by the nonoccurrence of the threats (Borkovec, 2002). In the short run, worrying prevents individuals from adequately processing situationally relevant information, which in turn, may prevent them from deploying their most adaptive coping resources (Borkovec, 1994). In the long run, psoriasis patients who engage in chronic worry experience all of these negative consequences and may fail to adequately resolve stressors relating to the condition that arise resulting increased anxiety, depression and decreases in wellbeing (Borkovec, 1994).

Worry and rumination have been identified as closely allied cognitive processes, that clearly share common aspects, in that they are both forms of unproductive and repetitive self-focused thought processes, which are generated by



similar mechanisms (Fresco et al., 2002; Hong, 2007; Segerstrom, Tsao, Alden, & Craske, 2000). Worry and rumination both appear to be similar maladaptive approaches in dealing with uncertainty. Nolen-Hoeksema et al. (2008) suggest that when people are worrying, they are uncertain about their ability to control important outcomes, but they have some belief that they could control those outcomes if they just try (or worry) hard enough. In contrast, when people are ruminating, they are more certain that important outcomes are definitely uncontrollable (Lyubomirsky et al., 1999). While there are arguably differences in the functions attributable to ruminative and worrisome thought (Nolen-Hoeksema et al., 2008), the similarities between these activities suggest that rumination and worry are related constructs that may shed light on a common mechanism that underlies perseverative and repetitive thought (Smith & Alloy, 2009). Furthermore, although researchers have tended to study rumination in relation to depression, and worry in relation to anxiety, there is in fact evidence implicating worry in depression (Starcevic, 1995), and linking rumination to anxiety (Nolen-Hoeksema, 2000).

Though both worry and rumination share common aspects both cognitive processes also have specific aspects (Watkins, 2008). Ruminative thinking is typically associated with sad/depressed feelings over past events (e.g., failures), worrisome thoughts are intimately associated with anxiety about potential future events (Papageorgiou & Wells, 1999; Raes & Williams, 2010; Watkins, 2004). Even when someone worries about something that has happened in the past, such as a faux pas they may have made in a social situation, they are often worrying about the implications of this event for the future (Barlow, 2002). In contrast, although rumination can involve concerns about possible threats in the future, it predominantly involves going over

past events, wondering why they happened, and thinking about the meanings of those events (Lyubomirsky et al., 1999; McLaughlin et al., 2007).

Mindful attention to the present moment and the ability to control the focus of attention more broadly are thought to counteract rumination and worry (Baer, 2003; Bishop et al., 2004; Teasdale et al., 1995). The idea that rumination serves as a mediator between mindfulness and depressive symptoms is in line with the theoretical rationale for MBCT (Segal et al., 2002), in which decreased rumination is identified as the key mechanism of change in mindfulness. A consensus exists in the research literature to suggest that mindfulness training might improve anxiety, depression and wellbeing through disengaging from automatic and maladaptive modes of rumination and worry (Harrington & Loffredo, 2010). Gu et al. (2015) carried out a systematic review and meta-analysis of mediation studies on how MBCT and MBSR might improve mental health and wellbeing. Despite differences in questionnaires, samples and methods of mediation analysis conducted across studies, findings generally demonstrated that repetitive negative thinking (RNT) (worry and rumination) constructs may be important mediators of the effects of MBIs on clinical mental health and wellbeing outcomes. Another recent systematic review of the mechanisms of change in MBCT in the treatment of recurrent major depressive disorder by van der Velden et al. (2015) found that alterations in mindfulness, rumination and worry mediated MBCT's effect on treatment outcomes. More research is required however to see how the relationships set out in the CBPM impact on worry and rumination, and how any changes to rumination and worry may impact on the anxiety, depression and wellbeing of psoriasis patients (Svendsen et al., 2016).

#### 2.4.8 CBPM domain and mediating variables

The nature of the research outlined above reflects the proliferation of mindfulness literature over the last two decades, and the fact that the debate over what the mechanistic details of the change process in MBIs remains unresolved (Farias & Wilkholm, 2016). The empirical research carried out on the impact of mindfulness-based interventions on potentially important mechanisms of action has provided partial preliminary evidence for a number of mindfulness variables, which may be improved by engaging in a mindfulness intervention (Gu et al., 2015). However, no empirical research has attempted to test how a mindfulness intervention may impact a large number of potentially important domain and mediating variables of an integrative model such as the CBPM in the same study. There are only a few small scale RCTs that have investigated the impact of mindfulness interventions on these variables in studies of patients with depression. These studies found that MBCT has medium to large effect on the mindfulness (Kuyken et al., 2008; Labelle et al., 2010; van Aalderen et al., 2012); a medium sized effect on self-compassion (Kuyken et al., 2008); medium to large effects on attention regulation (Bieling et al., 2012; Hargus et al., 2010); small to medium effects on acceptance (Bedard et al., 2014); a medium to large effect on rumination (Labelle et al., 2010; van Aalderen et al., 2012) and medium effects on the worry levels of these participants (Batink et al., 2013; van Aalderen et al., 2012).

#### 2.5 CBPM outcomes

Improving the anxiety, depression and wellbeing of psoriasis patients, who as already outlined in chapter 1, generally carry a large psychosocial burden due to the disease, should be an important health and mental healthcare goal. The literature

presented above on the CBPM domain and mediating variables, highlight how changes in each of these may improve psoriasis patient anxiety, depression and wellbeing both directly and indirectly. With this in mind, anxiety, depression and wellbeing, which are highly valued outcomes amongst psoriasis patients (Fordham et al., 2015), were chosen as the outcomes of interest for this CBPM for psoriasis patients. This is in line with the original BPM conceptualization of the BPM's outcomes being wellbeing and symptom reduction (Grabovac et al., 2011).

### 2.5.1 Psychological wellbeing

The evidence on whether engaging in a mindfulness intervention results in increased psychological wellbeing is mixed. The cultivation of psychological wellbeing has long been an essential feature of mindfulness interventions such as MBCT (Segal et al., 2002). A large body of research (which has a number of methodological limitations as discussed earlier in section 2.2) indicates that MBSR and MBCT may be effective for enhancing the wellbeing of individuals with a variety of medical and psychiatric conditions (see reviews by Baer, 2003; Grossman et al., 2004). However a systematic review and meta-analysis carried out by Goyal et al. (2014) including 47 trials with 3515 participants found low evidence of improved stress/distress and mental health-related quality of life. None of their conclusions yielded a high strength- of-evidence grade for a positive or null effect. Goyal et al. (2014) indicated that further research was required with disease-specific populations (e.g., psoriasis patients) to address uncertainties caused by inconsistencies in the body of evidence, deficiencies in statistical power, and risk of bias encountered in the studies they reviewed.

### 2.5.2 Anxiety and Depression (psychological distress)

As outlined in chapter 1.3.4, due to heavy psychological and psychosocial burden, psoriasis patients generally have higher levels of depression and anxiety than those who do not have the condition (Griffiths & Richards, 2001; Hayes & Koo, 2010). Results from some clinical studies conducted over the past 10 years have indicated that MBCT may only be modestly helpful for some individuals with symptoms of depression and anxiety (Eisendrath et al., 2008; Geschwind, Peeters, Huibers, van Os, & Wichers, 2012; van Aalderen et al., 2012). Goyal et al. (2014) identified that mindfulness meditation programmes had moderate evidence of improved anxiety (effect size, 0.38 [95% CI, 0.12-0.64] at 8 weeks and 0.22 [0.02-0.43] at 3-6 months), and depression (0.30 [0.00-0.59] at 8 weeks and 0.23 [0.05-0.42] at 3-6 months). During the course of 2 to 6 months, the mindfulness meditation program estimates ranged from 0.22 to 0.38 for anxiety symptoms and 0.23 to 0.30 for depressive symptoms (Goyal et al., 2014). Other meta-analysis have suggested general efficacy of MBIs for depressive and anxiety symptoms (Hofmann, Sawyer, Witt, & Oh, 2010), though head-to-head comparisons of MBIs to other evidence-based practices have resulted in mixed findings, some suggesting comparable outcomes, and others suggesting CBT is superior in certain conditions: Arch et al. (2013) for heterogeneous anxiety disorders; Goldin et al. (2016) for social anxiety disorder; and Manicavasgar, Parker, and Perich (2011) for non-melancholic depression. There is also mixed evidence-comparing MBIs to interventions such as progressive muscle relaxation (Agee, Danoff-Burg, & Grant, 2009; Jain et al., 2007). More recently, a meta-analysis was conducted on the effects of MBCT in patients currently meeting diagnostic criteria for a major depressive disorder (Strauss et al., 2014). It concluded that MBCT reduces depressive symptoms in currently depressed

patients and might be as effective as CBT. Whereas several investigations do point to benefits of mindfulness training on anxiety and depression, additional research is required to confirm such benefits.

Limited evidence exists on how mindfulness may relate to dermatology patients' anxiety and depression levels. Montgomery et al. (2016) examined the relationship between mindfulness and psychosocial distress in a hospital dermatological population ( $N=120$ ), and found higher levels of mindfulness, particularly awareness, are associated with reduced psychosocial distress and improved dermatological quality of life. While the results should be interpreted with caution given the cross-sectional nature of the study, the findings offer evidence that increasing mindfulness may be helpful in reducing distress in people living with visible skin conditions.

In the context of this PhD, anxiety and worry are considered to be similar constructs but different in a number of important ways. Anxiety is an emotion with a cognitive, emotional and physiological component (APA, 2008). Worry on the other hand is cognitive in nature and can form the cognitive component of anxiety, e.g. people with anxiety disorders usually have recurring intrusive thoughts or concerns (Kazdin, 2008). They may then avoid certain situations out of worry (APA, 2008). Worry is present to some extent in all individuals (Olatunji, Cisler, & Tolin, 2009). Anxiety is less common, and is a more visceral state than worry (Arch et al., 2013; Hofmann et al. 2010), as it may also include intense physical symptoms such as tension, sweating, trembling, dizziness or a rapid heartbeat (APA, 2008). Anxiety tends to impact personal functioning more than worry as it can be accompanied by

feelings of restlessness, uncomfortableness and can impact on a person's capacity to concentrate due to feeling of distress (Arch et al., 2013; Hofmann et al. 2010). Worry tends to focus on specific threats, whereas the feeling of anxiety can relate to a more generalised sense of concern. Worry in this way can more easily lead to attempts at problem solving and may lead to the development of strategies to deal with a given situation (Borkovec, 1994). Anxiety's more diffuse nature makes it less amenable to problem solving (Arch et al., 2013; Hofmann et al. 2010). Worry tends to be a more temporary state than anxiety, as when the issue that is causing worry resolves, the worry tends to dissipate (Fresco et al., 2002; Hong, 2007; Segerstrom, Tsao, Alden, & Craske, 2000), whereas anxiety can linger for longer periods even if there are no specific areas of a person's life to feel anxious about (Arch et al., 2013; Hofmann et al. 2010). Worry can also be seen as a normative cognitive psychological state; however, anxiety is considered a mental health issue in need of psychological treatment (Kazdin, 2008). Worry also often presents in depressive disorders, and some studies have found the correlations between worry and negative mood to be stronger than between worry and anxiety (Rabner et al. 2017).

## 2.6 Aims and objectives

It is clear from the literature outlined in chapters 1 and 2 that there are a number of gaps in the psychology, health and psoriasis literatures. There is a clear need for research that attempts to explore, better understand and provide empirical evidence for potential treatment options, such as mindfulness interventions, which may help to address the psychosocial impact that psoriasis has on patients. Research of this nature is also likely to support psychologists' and dermatologists' capacities to meet the needs of psoriasis patients through improved support-planning options.

The research literature on MBCT more generally is flawed methodologically, and higher quality research studies in the form of randomized controlled trials (RCT) have been consistently called for across clinical and nonclinical populations. This is in order to assert if MBCT does in fact have the positive effects articulated in the literature on mindfulness over the last 2 decades (Van Dam et al., 2018). The limited research on the impact of mindfulness interventions on the wellbeing, anxiety and depression of psoriasis patients was reviewed earlier in this chapter in section 2.1.3. It is clear from the limitations of these studies that more research is required to establish mindfulness interventions have a positive impact on the psoriasis symptoms, anxiety, depression and wellbeing of psoriasis patients. There is a clear need for research which uses an RCT design with patients who are suffering higher morbidities of psoriasis, anxiety, depression and poor wellbeing at baseline. It is also important that such a study would have sufficient power to detect small effects of mindfulness interventions on these important outcomes. This is particularly relevant as both D'Alton et al. (2018) and Fordham et al. (2015), both identified floor effects, due to low levels of anxiety and depression at baseline, as being a potential factor in the lack of significant effects of MBCT being found these outcomes. Should MBCT be established as an effective intervention, it may be added to the limited armamentarium, which may improve patients' stress coping strategies, enhance their wellbeing, reduce their anxiety and depression and increase their capacity to more effectively manage their treatment regime, all of which may also ameliorate psoriasis flares (Bundy et al., 2013; UK National Psoriasis Foundation, 2012).

One of the most consistently articulated gaps in the mindfulness literature is the need to identify what are the mechanisms of mindfulness, which influence



changes in anxiety, depression and wellbeing (Batink et al., 2013; Gu et al., 2015; Montgomery et al., 2016; Ohlsson, 2014; Van der Velden et al., 2015). Few studies have tested potential models of mindfulness, which causally connect how mindfulness variables may impact on psychological outcomes such as anxiety, depression and wellbeing. This is despite a number of models of mindfulness being proposed (Gu et al., 2015). Filling this research gap, by conducting research which focuses on obtaining a broader picture of, and attempting to identify, the potential predictor and mediators of the effectiveness of mindfulness on mental health outcomes and wellbeing of psoriasis patients using the same model is likely to be important for a number of reasons. Research of this nature is also likely to lead to: (1) more evidence being provided that may lead to the enhancement of the active components of mindfulness interventions, (2) contribute to a better understanding of possible causal relationships in the processes that predict and mediate between mindfulness variables, psoriasis, depression, anxiety and wellbeing (Kazdin, 2007; Van der Velden et al., 2015), and (3) support the development of innovative and more efficient interventions, in which active therapeutic components could be intensified and refined, whereas inactive or redundant elements could be discarded, leading to more potent and efficient therapies (Baer et al., 2006; Brown, 2015; Kuyken et al., 2010).

There has been very limited qualitative research carried out in the mindfulness literature studying psoriasis patients' lived experience of the burden of psoriasis and of engaging in a mindfulness intervention that may help manage this burden. Despite the importance of quantifying the chronic burden of psoriasis and the effectiveness of MBCT, the use of quantitative methodologies alone limit the extent to which researchers can attain a complete picture of how engaging in a supportive intervention

may help to improve psoriasis symptoms and the wellbeing, anxiety and depression of patients. A clear lack of research also exists using qualitative methodologies in order to attain a broader, theoretical understanding of the mindfulness mechanisms of therapeutic action, through understanding the subjective experiences of those receiving MBCT (Grossman, 2011; Smith, Richardson, Hoffman, & Pilkington, 2005). By combining quantitative with qualitative methodologies, in a single thesis, and comparing the results of each, a more complete picture of the experience of psoriasis and how engaging in a mindfulness intervention may ameliorate the distress it causes may emerge. This shedding of light on the contextual aspects of living with the burden of psoriasis in a systematic and detailed way could also provide triangulated evidence as to whether MBCT may be a useful intervention to support psoriasis patients physical and mental health (Ersser et al., 2002; Jobling & Naldi, 2006). Exploring and understanding the individual experiences of psoriasis patients of a mindfulness programme could also provide a deeper understanding of the positive and negative effects that mindfulness may have for patients, while also exploring what patients feel are the reasons behind the positive or negative effects (Creswell & Plano Clark, 2011).

In order to fill the research gaps outlined above, this PhD thesis has a number of aims: (1) to provide a greater understanding of the individual differences in the wellbeing, anxiety and depression of psoriasis patients, and the relationships between the CBPM domain, mediating and outcome variables, (2) to investigate the effectiveness of MBCT on psoriasis symptoms, anxiety, depression and wellbeing, (3) examine if MBCT was effective in improving the six CBPM domains (mindfulness, attention regulation, acceptance, self-compassion, non-attachment and aversion) and

two mediating variables (worry and rumination) of the CBPM theory, (4) to explore the experience of psoriasis patients who have completed an MBCT intervention, and (5) investigate if changes in the CBPM domain and mediating variables after engaging in an MBCT intervention may have a role to play in predicting the anxiety, depression and wellbeing levels of psoriasis patients.

In order to achieve these aims, this thesis employed multiple methodologies. The first research aim will be addressed in an individual differences study in chapter 3. The objectives of this chapter are: (a) to provide a greater understanding of the individual differences in wellbeing, anxiety and depression from a large sample of data collected from psoriasis patient sample using the CBPM as a theoretical framework, (b) provide empirical evidence regarding whether the CBPM is a potentially useful theoretical framework with which to understand the associations between the CBPM domain and mediating variables and psoriasis patient anxiety, depression and wellbeing, (c) provide greater theoretical transparency about what the statistically significant associations are between the CBPM domain, mediating and outcome variables. It is hypothesised that the direct and mediated relationships set out in the CBPM will explain variation in anxiety, depression and wellbeing.

The second and third aim of this thesis will be addressed in chapter 4. The objective of the RCT in chapter 4 is to investigate the effect of MBCT compared to a Treatment As Usual (TAU) control group over time on the CBPM domain (aversion, attachment, mindfulness, self-compassion, acceptance, attention regulation), mediating variables (rumination and worry) and psoriasis symptoms, anxiety,

depression and wellbeing. It is hypothesised that the MBCT intervention group will experience significant improvements in each variable and the control group will not.

The fourth and fifth aim of this thesis will be addressed in a chapter 5. Chapter 5 is a qualitative study, which will explore the experience of psoriasis patients who have completed and received the highest dose of an MBCT intervention, and the mechanisms of action of mindfulness, which may have improved psoriasis symptoms, wellbeing, anxiety and depression, should such improvements have occurred using the CBPM as a theoretical lens.

The fifth aim of this thesis will also be addressed in chapter 6. The objective of chapter 6, which is a moderated mediation study, is to investigate if improvements in each CBPM domain post MBCT intervention is either directly (e.g., if a person becomes more self-compassionate, is this increase in self-compassion likely to led to less anxiety), or indirectly (e.g., will this improvement in self-compassion lead to reduced worry and/or rumination, which will then lead to reduced anxiety) significantly associated with changes scores in the anxiety, depression and wellbeing of patients in the MBCT intervention group. It is hypothesised that the MBCT intervention group will experience significant moderated mediated changes in line with the CBPM and the control group will not.

**Chapter 3:** Individual differences in wellbeing, anxiety and depression in psoriasis patients.

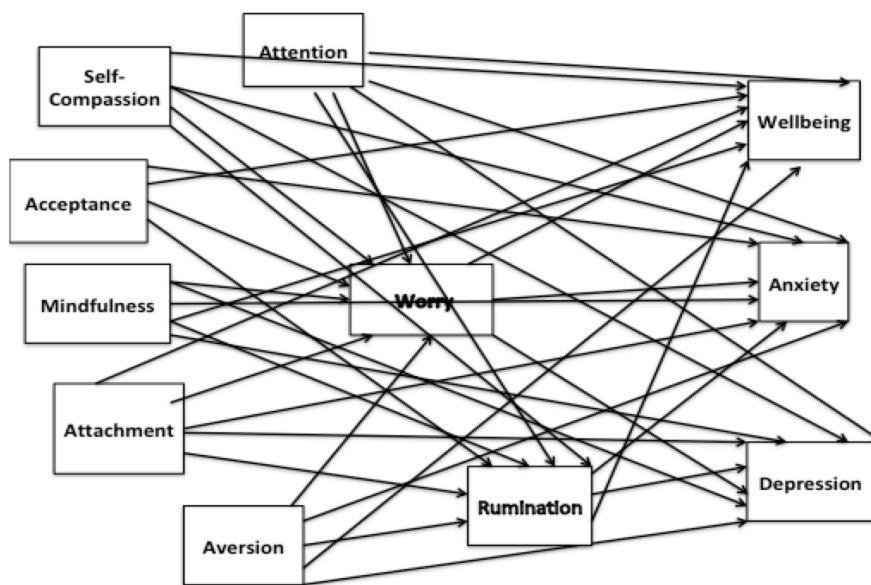
### 3.1 Introduction

As outlined in chapter 1, psoriasis can affect all aspects of a person's life, with the psychosocial burden of coping with psoriasis being rated by patients as one of the worst aspects of the disease (Armstrong et al., 2012). Due to this burden, people living with psoriasis tend to experience higher levels of anxiety, depression and lower levels of wellbeing than disease-free populations (Kurd et al., 2010). Chapter 2 highlighted that one of the most consistently articulated gaps in the mindfulness literature is the need to identify what the mechanisms of mindfulness, which influence changes in anxiety, depression and wellbeing might be (Batink et al., 2013; Gu et al., 2015; Montgomery et al., 2016; Ohlsson, 2014; Van der Velden et al., 2015). As chapter 2 further outlined, few studies have tested potential models of mindfulness that might explain how mindfulness variables may impact on psychological outcomes such as anxiety, depression and wellbeing. This is despite a number of models of mindfulness being proposed (Gu et al., 2015). Chapter 2 also highlighted the calls in the research literature on mindfulness, for future research to focus on obtaining a broader picture of, and attempt to identify potential predictors and mediators of the effects of mindfulness variables on anxiety, depression and wellbeing (Van der Velden et al., 2015).

#### 3.1.1 Aims of the current study

The aim of this study is to provide a greater understanding of the individual differences in the wellbeing, anxiety and depression of psoriasis patients, and the

relationships between the CBPM domain, mediating and outcome variables. In order to achieve this aim, this study had three objectives: (1) to provide a greater understanding of the individual differences in wellbeing, anxiety and depression from a large sample of data collected from psoriasis patient sample using the CBPM as a theoretical framework, (2) provide empirical evidence regarding whether the CBPM is a potentially useful theoretical framework with which to understand the associations between the CBPM domain and mediating variables and psoriasis patient anxiety, depression and wellbeing, (3) provide greater theoretical transparency about what the statistically significant associations are between the CBPM domain, mediating and outcome variables.



**Figure 3-1.** Model representing the direct and mediated effect of the CBPM domains on the outcome variables.

### 3.1.2 Research hypotheses

This study will test a number of hypotheses:

- 1) H<sub>1</sub>: SEM models: the direct and mediated CBPM will be a good fit to the data of large sample of psoriasis patients.
- 2) H<sub>1</sub>: SEM models: the direct and mediated CBPM will hold over time.
- 3) H<sub>1</sub>: Direct associations and predictor relationships: a) attention regulation, acceptance, self-compassion, non-attachment, mindfulness will have a statistically significant association with wellbeing, and a negative statistically significant association with anxiety and depression, b) aversion will have negative statistically significant association with wellbeing, and a statistically significant association anxiety and depression.
- 4) H<sub>1</sub>: Mediated associations and predictor relationships: a) attention regulation acceptance, self-compassion, non-attachment and mindfulness will have a statistically significant positive association with wellbeing, and negative significant association with anxiety and depression and these associations will be mediated by worry and rumination, b) aversion will have a statistically significant positive association with wellbeing, and a statistically significant positive association anxiety and depression and these associations will be mediated by worry and rumination.

## 3.2 Methods

### 3.2.1 Study design

This study used a repeated measures design and Structural Equation Modelling (SEM) to examine if variation in relationships theorized in the CBPM occurred naturally with a psoriasis patient sample. SEM was used to test a (1) direct CBPM, (2) mediated CBPM and (3) direct and mediated CBPM effects model of specified relations between non-attachment, aversion, acceptance, attention regulation, mindfulness, self-compassion, mental proliferation (worry and rumination),

wellbeing, anxiety and depression. This study utilised the strengths of SEM in order to provide exploratory information on which model of relationships best fitted the data from the present sample (Schumacker & Lomax, 2016).

### 3.2.2 Participants

Two hundred and eighty-five psoriasis patients ( $M$  age = 51 years;  $SD$  = 13.6 years; range = 21-85 years, males = 155; females = 130) participated in this study. A convenience sample was drawn from patients as they awaited their appointment with their consultant dermatologist, at a weekly specialist psoriasis clinic for patients with a diagnosis of mild to severe psoriasis, in an Irish general hospital. Participants met inclusion criteria for the study if they were adults over 18 years of age and had the ability to give written consent. While awaiting their appointment, the researcher approached potential participants and ascertained their interest in taking part in the study. If the participant was interested, psychological scales with established validity were administered by the data collector at 2 points: (1) at participant entry to the study, and (2) 4 months later. Two hundred and eighty-five participants completed the measures at time 1 ( $t_1$ ), with 209 of these patients filling in the measures at time 2 ( $t_2$ ). This number of patients was recruited after a power calculation was carried out using G-Power (Faul, Erfelder, Buchner, & Lang, 2014). This calculation identified that in order to achieve a power of 0.95 detecting a moderate correlation of .3 between the variables under investigation (using Pearson  $r$ ), a sample of 200 participants was required. The sample size was also deemed to be sufficient to power SEM analyses of model fit, as it was in line with the most commonly used rule-of-thumb guidelines (Wolf, Harrington, Clark, & Miller, 2013) advanced by Boomsma (1982) of including a minimum sample size of 200, and Bentler and Chou (1987) who identified a need



for 10 participants per parameter estimated. These rule-of-thumb guidelines have also been used recently in similar published psoriasis research e.g. Howells et al. (2018).

In order to minimize potential systematic differences between the groups who filled in the measures at t1 and those whose who filled them in at t1 and t2, numerous attempts were made to attain as high a response rate for t1 and t2 as there was at t1. If the participant missed their psoriasis appointment, they were followed up on the next appointment date, or the questionnaires were sent via post (Henderson & Page, 2007). If data was collected from participants at t2 within a month either side of the 4 month cut off (i.e. between months 3 to 5 after t1 data collection) this data was included in the analysis of the t2 sample. As much information was recorded on the non-participants at t2 as was feasible and permitted in order to allow comparisons to be made between responders and non-responders (Henderson & Page, 2007).

### 3.2.3 Measures

#### 3.2.3.1 CBPM outcomes

##### 3.2.3.1.1 Wellbeing: Ryff's Psychological Wellbeing Scales

Ryff's Psychological Wellbeing Scales (Ryff, 1989) includes 6 domains each containing 9 items: 1) self-acceptance, 2) purpose in life, 3) environmental mastery, 4) personal growth, 5) positive relations with others, and 6) autonomy (Ryff, 1989).

Scores on this measure range from 42-252 with higher scores indicating higher levels of wellbeing. The psychometric properties for this scale were originally tested on a sample of 321 healthy men and women (Ryff, 1989). Findings included high internal consistency for the 6 domains (Cronbach's alpha's from .86-.93), and good test-retest reliability with Pearson product moment coefficients over a six-week period ranging

from .81-.88. Tests of validity of Ryff's Psychological Wellbeing Scales are scarce; however, its multidimensional structure of psychological wellbeing has been validated on a nationally representative sample of English-speaking adults aged 25 and older ( $N = 928$ ) (Ryff & Keyes, 1995). Higher scores on this scale indicate higher levels of wellbeing. The Cronbach's alpha for the present study was .95.

#### 3.2.3.1.2 Anxiety and Depression: Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) is a self-report rating scale of 14 items, designed to measure anxiety (HADS-A) and depression (HADS-D), with each subscale consisting of 7 items. A score of 0-7 on either sub scales indicates that the participant is in the normal range for that scale, a score of 8-10 on the scale indicates borderline cases and scores from 11-21 indicate that the person has abnormal levels of anxiety or depression. Higher scores on each scale indicate higher levels of anxiety or depression. The scale has been validated against interview ratings and has good internal reliability (Zigmond & Snaith, 1983). Lewis and Wessley (1990) found that the HADS was comparable to the General Health Questionnaire (Goldberg & Williams, 1988) in its ability to detect cases of minor psychiatric disorder in dermatology patients. The Cronbach's alpha for the present study for HADS-A was .86 and .78 for HADS-D.

### 3.2.2 CBPM domains

#### 3.2.2.1 Acceptance: Philadelphia Mindfulness Scale

The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) is a 20-item questionnaire that measures two dimensions of mindfulness: awareness (10 items) and acceptance (10 items). Scores on this measure

range from 10-50, with lower scores indicating higher levels of acceptance.

Cardaciotto et al. (2008) reported very good internal consistency ( $\alpha = .91$ ) for the acceptance sub-scale with a population of undergraduates. In terms of construct validity, Cardaciotto et al. (2008) reported that the awareness subscale was strongly correlated with the Kentucky Inventory of Mindfulness Skills (KIMS) Observe (Baer, Smith, & Allen, 2004) subscale ( $r = .83$ ) and the acceptance subscale was strongly correlated with the KIMS Accept without Judgment subscale ( $r = .79$ ) (Baer, Smith, & Allen, 2004). The Cronbach's alpha for the present study for PHLMS-acceptance was .9.

### 3.2.2.2 Mindfulness: Southampton Mindfulness Scale

The Southampton Mindfulness Questionnaire (Chadwick et al., 2008) is a 16-item instrument designed to measure elements of mindfulness when unpleasant thoughts and images arise, including mindful observation, letting go, non-aversion, and non-judgment (Chadwick et al., 2008; 2005). The SMQ was used in this study as it specifically assesses how (mindfully) one relates to “distressing thoughts and images, which are important phenomena in all mental health problems and the cornerstone of cognitive theory and therapy” (Chadwick et al., 2008, p. 452). Scores on this measure range from 0-96. High scores on this measure indicate higher levels of mindfulness. The SMQ was included in a study by Baer et al. (2006) exploring the psychometric properties of five mindfulness questionnaires in a sample of 613 undergraduates. The SMQ was internally reliable ( $\alpha = .85$ ) and was significantly positively correlated with other mindfulness measures. Chadwick et al. (2008) examined the SMQ's reliability, concurrent validity, factor structure, and clinical sensitivity. The SMQ had a Cronbach's alpha of .89. For 197 participants involved in

assessing concurrent validity, SMQ and Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) scores correlated significantly ( $r = .61, p < .001$ ). The Cronbach's alpha for the present study was .74.

### 3.2.2.3 Attention Regulation: Experiences Questionnaire

The Experiences Questionnaire – Decentering was used to measure attention regulation in this study (EQ: Fresco et al., 2007). This is an 11-item self-report measure of the capacity to regulate attention through decentering, which is the ability to take a step back from thoughts and feelings, to view them objectively as mental events, rather than taking them at face value (Fresco et al., 2007). Higher scores on the EQ indicate higher levels of attention regulation. Scores on this measure range from 11-55. The EQ Decentering scale has shown high internal reliability: Cronbach's alpha = .90 (Fresco, et al., 2007). Fresco et al. (2007) examined the concurrent and discriminant validity of the decentering scale in a nonpatient sample. Concurrent validity was supported by significant positive correlations with cognitive appraisal ( $r = .25$ ), and significant negative correlations with experiential avoidance, brooding rumination, emotional suppression, current depression, and anxiety symptoms ( $r$ 's = .31 to .49). The Cronbach's alpha for the present study was .89

### 3.2.2.4 Non-Attachment: Non-Attachment Scale

The Non-Attachment Scale (NAS; Sahdra, Shaver, & Brown, 2010) is a 30-item questionnaire. Higher scores on the NAS indicate higher levels of non-attachment. Scores on this measure range from 30-180. The NAS has shown high internal reliability; Cronbach's alpha = .92, in a study of 382 undergraduate sample (Sahdra et al., 2010). In Sahdra et al. (2010), the NAS was moderately to highly

correlated ( $r$ 's = .35–.60) negatively with anxious attachment (Experiences in Close Relationships (ECR; Brennan, Clark, & Shaver, 1998) and nonreactivity (Nonreactivity to Internal Experience subscale of the Five Facet Mindfulness Questionnaire (Baer et al., 2006). The Cronbach's alpha for the present study was .92.

#### 3.2.2.5 Aversion: Acceptance and Action Questionnaire –II

Aversion was measured with the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011), a 7-item self-report measure. High scores on the AAQ-II are reflective of greater experiential avoidance and immobility, while low scores reflect greater acceptance and action. Scores on this measure range from 7-49. Results from 2,816 participants across 6 samples (3 different samples of undergraduate students in USA, 2 UK bank employee samples and 1 group of drug users seeking psychological treatment in a New York University hospital) indicate satisfactory structure, reliability, and validity of this measure. For example, the mean alpha coefficient was .84 (.78-.88), and the 3 month and 12 month test-retest reliability was .81 and .79 respectively (Bond et al., 2011). The Cronbach's alpha for present study was .94.

#### 3.2.2.6 Self-Compassion: Self-Compassion Scale

The 26-item Self-Compassion Scale (SCS; Neff, 2003) includes dimensions (awareness, self-kindness, self-judgment and common humanity) thought to be important to the change process in mindfulness variables (Feldman & Kuyken, 2011). Higher scores on the SCS indicate higher levels of self-compassion. Scores on this measure range from 26-130. Average scores of 1-2.5 are considered as low levels of self-compassion, 2.5-3.5 indicates moderate self-compassion and 3.5-5 indicates high

self-compassion (Neff, 2003a). The internal reliability of the SCS has been found to be consistently high in studies across a wide variety of populations suggesting that all SCS items are inter-correlated in a satisfactory manner (Allen et al., 2012; Neff & Pommier, 2013; Werner et al., 2012). The large body of research (e.g., systematic review carried out by Zessin, Dickhauser, & Garbade, 2015) indicating that scores on the SCS predict wellbeing constitutes strong predictive validity. The SCS also demonstrates known groups validity: undergraduate and community adults evidence significantly lower scores on the SCS than individuals who practice Buddhist meditation (Neff, 2003a; Neff & Pommier, 2013). The scale demonstrates good convergent validity as well. For instance, therapists' ratings of how self-compassionate individuals were (using a single item) after a brief interaction were significantly correlated with self-reported SCS scores (Neff et al., 2007a). The Cronbach's alpha for the present study was .89.

#### 3.2.2.7 CBPM mediating variables: Mental Proliferation

Mental proliferation was assessed using scales measuring rumination and worry.

##### 3.2.2.7.1 Rumination Reflection Questionnaire

Rumination was measured using the 12-item subscale from the Rumination Reflection Questionnaire (Trapnell & Campbell, 1999) which measures the extent to which participants are disposed to engage in repetitive thinking about their past (rumination) and to reflect on themselves out of epistemic curiosity, that is, out of a philosophical love of self-exploration (reflection). Higher scores on the RRQ-rumination indicate higher levels of rumination. Scores on this measure range from

12-60. Trapnell & Campbell (1999) reported a high coefficient alpha for both subscales (Rumination = .90, and Reflection = .91). The subscales also showed good convergent validity, as each correlated highly with its respective factor predicted from the Big Five factor model of personality (Rumination with Neuroticism, and Reflection with Openness to Experience; Trapnell & Campbell, 1999). They also showed good discriminant validity in that they showed a minimal correlation with each other ( $r = .22$ ) (Trapnell & Campbell, 1999). The Cronbach's Alpha for the present study was .93.

#### 3.2.2.7.2 Penn State Worry Questionnaire

The 16-item Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) assesses the extent to which worry is pervasive, excessive, and difficult to control. Higher scores on the PSWQ scale indicate higher levels of worry, with a cut off of 45 being deemed as high worry (Meyer et al., 1990). The PSWQ has been shown to have excellent internal consistency ( $\alpha = .91$ ; Meyer et al., 1990) and good convergent and discriminant validity for Generalised Anxiety Disorder when compared to other anxiety disorders and community controls (Brown, Antony, & Barlow, 1992). The Cronbach's alpha for the present study was .94.

#### 3.2.3 Ethics review

Ethical approval was sought and granted from the ethics committee of the School of Psychology in Trinity College, Dublin and from the Ethics Committee of the hospital involved in the study (see Appendix 1 for approval letters). In order to attain informed consent, an information sheet about the purpose of the study was provided to each participant to sign (see Appendix 2 for this study's protocol).

### 3.2.4 Analytic Approach

The aims of this study and the nature of the research hypotheses (outlined in Section 3.1.1 and 3.1.2) coupled with the recruitment of a sufficient number of participants to power this study, provided the rationale for the use of SEM as a data analysis technique. The data collected from these participants were screened for missing values and any error cases, such as extreme outliers. No outliers were found, with some data being missing at random (Schafer & Graham, 2002). In order to construct SEMs, a strict assumption exists that there are no missing data in the dataset (Schumacker & Lomax, 2016). In order to attain a complete data set, a multiple imputation strategy was utilized using LISREL 9.30 (Schafer & Graham, 2002).

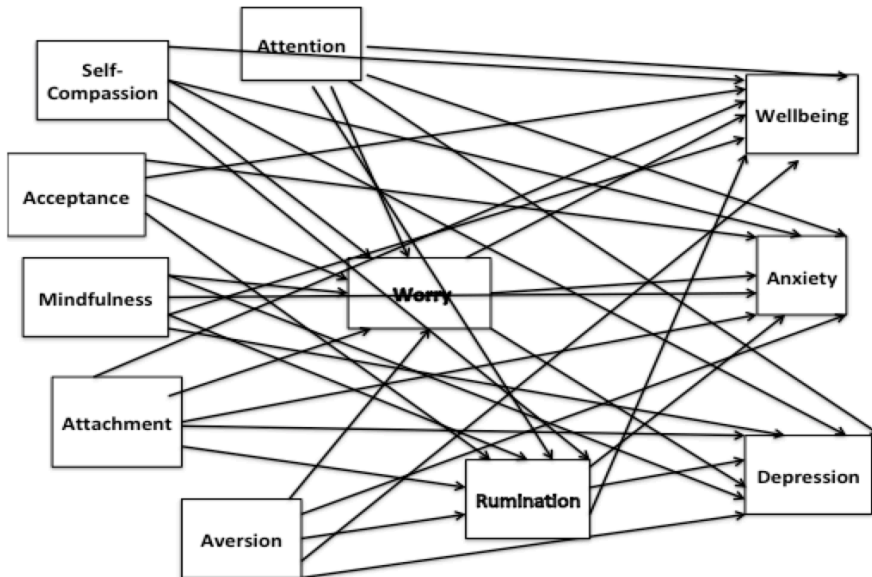
SEM is a multivariate statistical process with which a researcher can: construct theoretical models such as the CBPM, test its measurement reliability, hypothesize and test its theoretical relationships, take into account measurement errors, and consider both direct and indirect effects of variables on one another (Malaeb, Summers, & Pugsek, 2000). SEM was used to examine the relationships in the CBPM as: (a) it is a very powerful multivariate technique, and a more powerful alternative than any other multivariate technique, (b) it uses a conceptual model and path diagrams to capture complex and dynamic relationships within a web of observed variables, (c) it simplifies testing of mediation hypotheses because it is designed, in part, to test these more complicated mediation models in a single analysis, (d) it can also be used when extending a mediation process to multiple independent variables, mediators or outcomes (this contrasts with standard regression, in which ad hoc methods must be used for inference about indirect and total effects)



and (e) it also allows for multiple hypotheses to be tested simultaneously (Byrne, 2012; MacCallum & Austin, 2000).

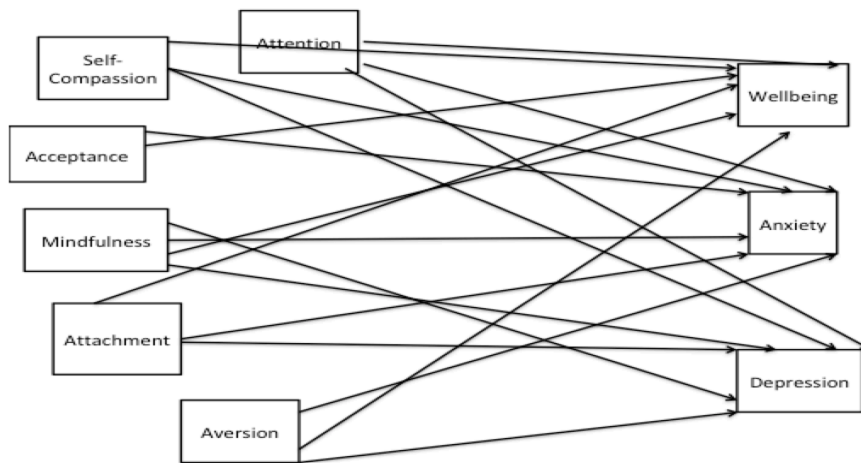
This study adopted a multiple indicator individual differences study approach to test: (1) if the structural model will support a direct and mediated effects CBPM in which acceptance, mindfulness, attention regulation, self-compassion, non-attachment and aversion are both directly and indirectly associated with wellbeing, anxiety and depression through reduced rumination and worry, (2) if this model set out at time 1 would be temporally invariant at time 2, and (3) which of the CBPM domains are significantly associated with the anxiety, depression and wellbeing of psoriasis patients, either directly or through mediated relationships with worry and rumination. The analysis for this study was carried out in three steps: (1) Measurement and structural models based on the CBPM were constructed (model specification and identification). Three models, (a direct effects, a mediated effects and a direct and mediated effects) representing different potential CBPM process arrangements based on the literature in chapter 2 were specified and estimated using LISREL 9.30 (Jöreskog & Sörbom, 2009). A covariance matrix and an asymptotic weight matrix were computed using PRELIS and the parameters estimated using maximum likelihood (Jöreskog & Sörbom, 2009). These models were then assessed to ascertain if there were a good model fit to the data received (model estimation and testing) (Schumacker & Lomax, 2016), (2) A multiple group model was developed in order to test measurement invariance and assess if the best fitting CBPM model specified in this research study matched the data received at time point 2, and (3) the paths of the best fitting CBPM model were then analysed to identify which of the CBPM domains had significant associations with the outcomes.

The three models differed only in terms of how the relationships between the variables were modeled. The different models are shown in Figure 3-1 (Direct and Mediated effects model), Figure 3-2 (Fully Mediated model) and Figure 3-3 (Direct Effects model).



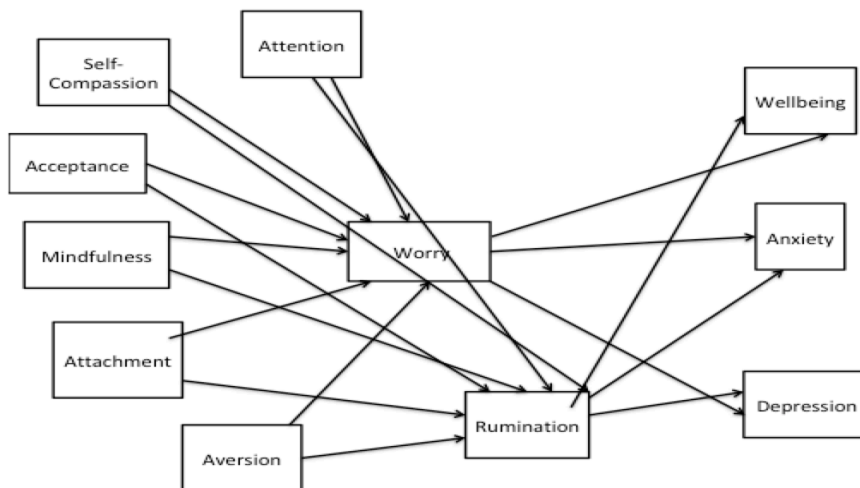
**Figure 3-1.** Model representing the direct and mediated effect of the CBPM domains on the outcome variables.

Figure 3-1, the direct and mediated effects CBPM specifies the potential causal relationships between attachment, aversion, acceptance, mindfulness, attention regulation and self-compassion and how they directly and indirectly predict wellbeing, anxiety and depression when fully mediated by mental proliferation.



**Figure 3-2.** Model representing the direct effect of the CBPM domains on the outcome variables.

Figure 3-2 above, or the direct effect model, specifies only a potential direct causal relationship of the variables attachment, aversion, acceptance, mindfulness, attention regulation and self-compassion on rumination, worry, wellbeing, anxiety and depression.



**Figure 3-3.** Model representing the mediated effect of the CBPM domains on the outcome variables.

Figure 3-3 above, or the fully mediated model, specifies the potential causal relationships between attachment, aversion, acceptance, mindfulness, attention regulation and self-compassion and how they predict wellbeing, anxiety and depression when fully mediated by worry and rumination.

There are no golden rules for assessment of model fit in SEM modeling, and considerable debate in the literature on what the best assessments of model fit are, so reporting a variety of indices is necessary (Crowley & Fan, 1997; Hooper et al., 2008). In line with Hooper et al. (2008) and Kline (2005), this study includes the Chi-Square statistic (where a non-significant chi-square indicates model fit), its degrees of freedom and *p* value. It also includes the Standardised Root Mean Square Residual (SRMR) ( $< .05$ , Hooper et al., 2008), the Comparative Fit Index (CFI) ( $\geq .95$ , Hu & Bentler, 1999) and the parsimony fit index - PNFI ( $< .05$ , Hooper et al., 2008). The Akaike Information Criterion (AIC; Akaike, 1987) was used for the purposes of model comparison, with the smallest value being indicative of the most parsimonious model (Byrne, 2012).

In order to assess if the CBPM held across time, a measurement model, testing the data of the subgroup of 209 participants who completed the CBPM measures at t1 and t2 was set up in order to test measurement invariance (Bialosiewicz, Murphy, & Berry, 2013). Multi-group confirmatory factor analysis was used to test for measurement invariance (Bollen, 1989; Jöreskog, 1971). As participants who completed time 2 data had also completed time 1 data, it can be anticipated that the conditions for full metric invariance testing are established prior to carrying out the statistical tests articulated below (Zercher, Schmidt, Ciecicuh, & Davidov, 2015). In

order to evaluate whether measurement invariance was established, this study used the cut-off values for the difference in the comparative fit index (CFI) and the standardized root mean square residual (SRMR) (Chen, 2007). This is based on the results of Chen's (2007) simulation study, in which the following recommendation was proposed: for a sample size less than 300, noninvariance is indicated by a change in CFI larger than .005 supplemented by a change in SRMR larger than .025 compared with the configural invariance model (Zercher, Schmidt, Ciecicuh, & Davidov, 2015).

### 3.3 Results

Patient characteristics for patients who filled in the measures at t1 only and those that filled in the measures a t1 and t2 for this study are shown in Table 3-1. The patient demographic and clinical characteristics of the participants who filled in both sets of measures are very similar to the characteristics of the participants who filled in the measures at t1. Chi-squared tests found that the percentage of females ( $\chi^2(1, N=284) = .942, p = .33$ ), males ( $\chi^2(1, N=284) = .028, p = .87$ ), those receiving topical treatment ( $\chi^2(1, N=284) = .002, p = .97$ ), sytematic treatment ( $\chi^2(1, N=284) = .035, p = .85$ ), phototherapy ( $\chi^2(1, N=284) = .028, p = .87$ ), biologics ( $\chi^2(1, N=284) = .041, p = .84$ ), psychotropic medication ( $\chi^2(1, N=284) = .004, p = .95$ ) and those who have a diagnosus of psoriatic arthritis ( $\chi^2(1, N=284) = .143, p = .71$ ) did not differ between the groups.

#### **Table 3-1.**

Demographics and clinical characteristics of participants who provided data at t1 and

---

those who completed the data at t1 and t2.

Sample Characteristic	Time 1 only (n=76)	Time 1 and 2 (n=209)
	n (%)	n (%)
Female	32 (42)	100 (48)
Male	44 (58)	109 (52)
Topical treatment	19 (25)	55 (26)
Systemic treatment	26 (34)	73 (35)
Phototherapy	4 (5)	10 (5)
Biologics	43 (57)	117 (58)
Psychotropic medication	8 (10)	19 (9)
Psoriatic Arthritis	14 (19)	36 (17)

Table 3.2 presents the means and standard deviations for each CBPM domain, mediating and outcome variables for the group that filled in the measures at t1 only and t1 and t2. Overall both group averages are in the normal range for HADS-D and HADS-A. Of the participants who filled in the measures at t1 only, 40 (53%) participants were in the normal range, 19 (25%) were in the borderline abnormal range and 17 (22%) were in the abnormal range on the HADS-A. Of those that filled in both, 138 (66%) participants were in the normal range, 44 (15%) were in the borderline abnormal range and 27 (9%) were in the abnormal range on the HADS-A. Fifty-five (73%) participants were in the normal range, 14 (18%) were in the borderline abnormal range and 7 (9%) were in the abnormal range on the HADS-D. From the 285 participants who filled in both sets of measures, 185 (88%) were in the normal range, 20 (10%) were in the borderline abnormal range and 4 (2%) were in the abnormal range on the HADS-D. Forty-five (59%) participants scored as high

worriers on the PSWQ, with 123 (41%) participants scoring as low worriers at t1. Of those that filled in both, 104 (49.7%) participants scored as high worriers on the PSWQ, with 105 (50.3%) participants scoring as low worriers. Nine (12%) participants were in the low range for self-compassion, 49 (64%) were in the moderate range and 18 (24%) were in the high self-compassion range on the SCS at t1. Of those that filled in both, 28 (13%) participants were in the low range for self-compassion, 99 (47%) were in the moderate range and 82 (39%) were in the high self-compassion range on the SCS.

Independent samples t-tests found that the group of patients who did not fill in t2 measures had significantly lower wellbeing ( $t(279) = 1.73, p = .03$ ) and depression ( $t(279) = .135, p = .003$ ) scores than the group who filled in both sets of measures. There were no significant differences between the groups on acceptance ( $t(282) = 4.7, p = .09$ ), mindfulness ( $t(282) = .57, p = .82$ ), attention regulation ( $t(281) = .04, p = .61$ ), non-attachment ( $t(280) = .09, p = .20$ ), aversion ( $t(281) = .89, p = .4$ ), rumination ( $t(281) = 8.05, p = .11$ ), worry ( $t(279) = 3.65, p = .49$ ) and anxiety ( $t(281) = .24, p = .14$ ). Due to the fact that significant differences existed between these two groups on wellbeing and depression scores, the SEM model on the 285 participants cannot be replicated with the group with 209 participants. Due to this, the test of temporal invariance on the CBPM was carried out on the data from the 209 participants at t1 and t2.

### **Table 3-2.**

Means and standard deviations for the CBPM domain, mediating and outcome variables at t1 for participants who filled in the measures at t1 only and at t1 and t2.

	T1 (n=76)		T1 and T2 (n=209)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
PWBS	160.42	29.27	169.86	32.95
HADS-A	7.8	3.82	6.98	4.17
HADS-D	4.97	3.45	3.56	3.47
RRQ	38.17	7.37	36.34	8.99
PSWQ	48.66	12.4	47.37	14.27
PMS	28.76	6.98	30.62	8.34
SMS	51.37	13.47	51.8	14.17
EQ	37.92	7.73	38.46	7.66
NAS	130.2	19.9	135.1	21.91
AAQ	20.13	8.88	19.06	9.6
SCS	80.96	15.73	83.5	17.72

### 3.3.1 SEM model fit statistics

The model fit statistics for all 3 CBPM models at t1 are presented in Table 3-3 below. The fit indices in table 3-3 indicate that direct and mediated effects CBPM model has a good model fit to the data (Byrne, 2012). The chi-square is non-significant ( $p = .15$ ), which is  $< .06$ ; the PNFI = .04, which is  $< .05$ ; the CFI = 0.99, which is  $> 0.95$ ; and the SRMR = .001, which is  $< .05$  (Byrne, 2012). The direct and mediated effects CBPM also had greater explanatory power than the other two models. This is indicated by the lower AIC indicating that this model provides a significantly better explanation of the sample data than the direct effect and mediated effect models.



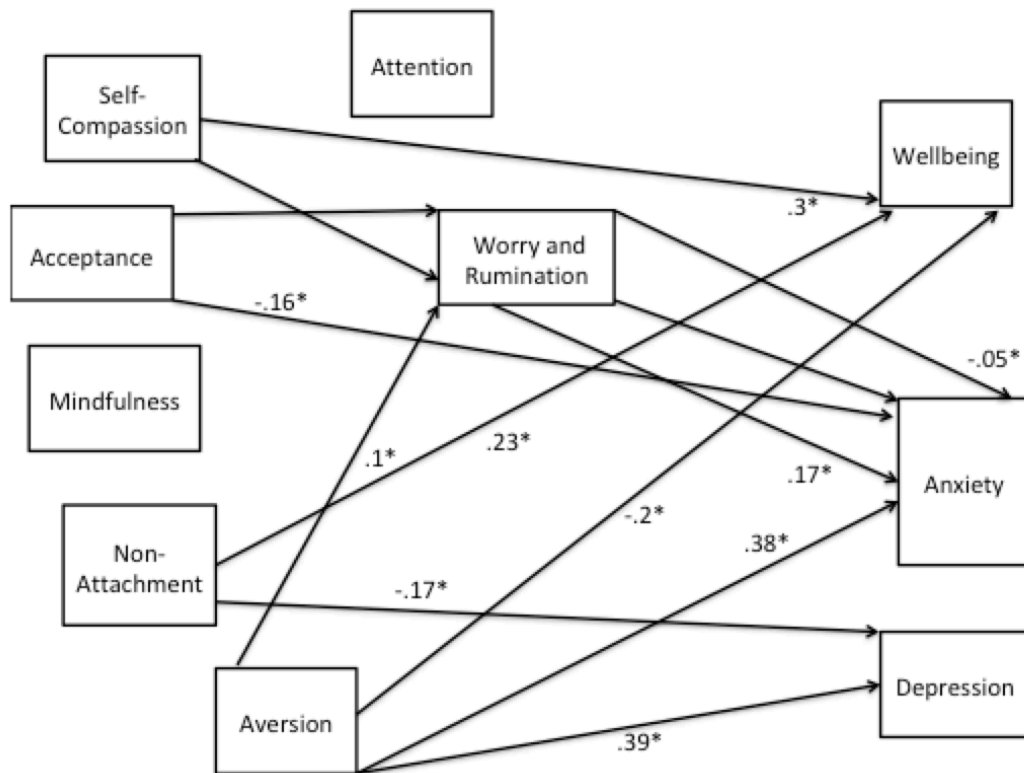
**Table 3-3.**

SEM model fit statistics.

Model	Model 1:	Model 2:	Model 3: Direct and Mediated
Type	Direct	Mediated	Model
Df	22	20	2
<i>P</i>	0	0	0.14
RMSEA	0.342	0.158	0.058
AIC	15822.32	15760.72	15638.65
PNFI	0.283	0.339	0.0363
CFI	0.71	0.938	0.999
SRMR	0.33	0.01	0.00909

### 3.3.2 Significant CBPM direct and indirect effects

The significant direct and indirect effects of the CBPM domain and mediating variables on the CBPM outcomes are presented below in Figure 3-4. Non-attachment ( $r(283) = .23, p < .05$ ), self-compassion ( $r(283) = .3, p < .05$ ) and aversion ( $r(283) = -.2, p < .05$ ) were all found to have significant direct effects on wellbeing. Acceptance ( $r(283) = -.16, p < .05$ ), and aversion ( $r(283) = .38, p < .05$ ) were both found to have significant direct effects on anxiety. Acceptance ( $r(283) = -.05, p < .05$ ), aversion ( $r(283) = .1, p < .05$ ) and self-compassion ( $r(283) = -.17, p < .05$ ) were also found to have a significant indirect effect on anxiety through worry and rumination. Aversion ( $r(283) = .39, p < .05$ ) and non-attachment ( $r(283) = .17, p < .05$ ) were both found to have a significant direct effect on depression.



**Figure 3-4.** Significant effects of the direct and mediated CBPM.

### 3.3.3 Model replication

As a rigorous test of the equivalence of the direct and mediated effects CBPM model fit, the t1 and t2 data attained from the 209 participants who completed the measures at both time points was tested for temporal invariance using a LISREL multi-group analysis (Jöreskog, 1971). The factor loadings and path estimates were fixed to be invariant across the two datasets to examine whether the constructs being measured were similar in both samples and whether the relationships among these constructs were similar. The model at t1 produced a significant Chi-square ( $\chi^2 = 6.97$ ;  $df = 2$ ;  $p = .03$ ), a standardized RMR of .0128 and a CFI = .997. The model at t2 produced a significant Chi-square ( $\chi^2 = 6.7$ ;  $df = 2$ ;  $p = .04$ ), a standardized RMR of .0136 and a CFI = .997. The significant Chi-square results indicate poor model fit at both time points. The CFI and standardized RMR values however both suggest good

model fit to the data at t1 and t2. Metric invariance between the two models was established, as the CFI for both models did not change by a factor larger than .005, and the standardized RMR also did not change by a factor larger than 0.025 in line with Chen (2007). Thus, overall, the data suggest that the direct and mediated effects CBPM model for the dataset of the 209 participants was a reasonable fit to the data at t1 and t2 (Hooper et al., 2008), and was also temporally invariant

### 3.4 Discussion

The psychological impact of having psoriasis, which is a chronic, painful and disfiguring disease (WHO, 2016) has been identified as being one of the worst aspects of the condition (Armstrong et al., 2012). The psychosocial burden of this condition has led to a significant proportion of psoriasis patients suffering from anxiety, depression, and poor wellbeing (Hayes & Koo, 2010; ISF, 2015; Kurd et al., 2010; Schmitt & Ford, 2007). The aim of this study was to provide a greater understanding of the individual differences in the wellbeing, anxiety and depression of psoriasis patients, and the relationships between the CBPM domain, mediating and outcome variables. This section will now discuss the important findings of this study, then its theoretical and clinical implications along with the potential for future research studies. This study's limitations will then be discussed.

#### 3.4.1 Model fit

This study has provided evidence in favour of the direct and mediated effects CBPM, based on Grabovac et al. (2011) as an explanatory framework of variation in the anxiety, depression and wellbeing of psoriasis patients due to variation in the CBPM domains. This result helps to provide theoretical transparency and clarity on

the patterns of relationships between the mindfulness variables set out in chapter 2, and psoriasis patient anxiety, depression and wellbeing. The combined direct and mediated CBPM model was found to be a good fit to the data provided by this cohort of psoriasis patients, across a range of fit indices. This model also had superior explanatory power to a direct effect and the fully mediated model, which reflected the nature and range of effects articulated in the mindfulness literature from chapter 2 with the same variables. The limited literature available attempting to explain the patterns of relationships between mindfulness variables and anxiety, depression and wellbeing has usually identified either significant direct (e.g., Hölzel et al., 2011) or mediated (e.g., Gu et al., 2015) pathways but not both at the same time. This study thus highlights the potentially complex direct and mediated interactions between mindfulness variables and anxiety, depression and wellbeing. The mediating role that rumination and worry appears to play in the significant relationships between the CBPM domains and anxiety is consistent with CBT models of anxiety (Hofman, 2012). The explanatory potential of the direct and mediated effects CBPM was further supported by the reasonable fit to the data of the sub sample of 209 participants who completed the measures at t1 and t2. This model was also found to temporally invariant four months later. Testing measurement invariance is a very complex issue with a number of factors potentially affecting the magnitude of changes in fit statistics, such as pattern of noninvariance, the number of degrees of freedom, and model complexity (Chen, 2007). This means that the interpretation of the results of model invariance in this study should be done with caution and these results should be considered preliminary.

### 3.4.2 Aversion

Aversion was found to be directly significantly associated with wellbeing, anxiety and depression. These results support the relationships set out in the CBPM, and are also consistent with the cross sectional studies of Gross (2002), Salovey et al. (2000), Segerstrom et al. (2003) who found that avoidance of thoughts and emotions was associated with worse psychological outcomes including reductions in wellbeing and increases in anxiety and depression. Aversion was also found to be significantly associated with anxiety through a mediated relationship with worry and rumination. This finding concurs with the BPM's theoretical framework (Grabovac et al., 2011), which suggests that reduced aversion (to thoughts, feelings and emotions) leads to less need for emotional control and rigid negative thinking in the form of rumination or worry, which leads to reduced anxiety in the CBPM. This result is also supported by research which indicated that the extent to which a person may use strategies of aversion to regulate negative thoughts and emotions, either through thought suppression (Beevers et al., 1999; Wenzlaff & Luxton, 2003), under-engagement with internal experiences (Buchheld et al., 2002; Hayes & Feldman, 2004; Kabat-Zinn, 1990), or avoidance of emotions (Ottenbreit & Dobson, 2004) is likely to exacerbate problems related to these negative thoughts and emotions by increasing levels of worry and rumination, which may ultimately reduce wellbeing and/or increase anxiety.

### 3.4.3 Self-compassion

Self-compassion was chosen as an additional domain to be added to the original BPM (Grabovac et al., 2011) due to the support it received as a potentially important predictor of anxiety, depression and wellbeing in the mindfulness literature outlined in chapter 2. The decision to add self-compassion to the direct and mediated

effects CBPM appears to be supported by the empirical findings of significant direct and mediated effects found in this study. Self-compassion was found to have a significant indirect effect on anxiety through a mediated relationship with reduced worry and rumination. These findings are consistent with research indicating that lack of feelings of caring and kindness towards self in the face of difficult life events may foster an avoidant way of functioning through the use of rumination and worry, which may ultimately lead to increased anxiety (Krieger et al., 2013; Neff, 2003a; Neff & Dahm, 2015; Neff & Vonk, 2009). The findings self-compassion having a significant direct effect on wellbeing is also consistent with other empirical studies which found that higher levels of self compassion were associated with higher wellbeing such as Barnard and Curry (2011), MacBeth and Gumley (2012), Neff and Dahm (2015), Neff, Kirkpatrick, and Rude (2007) and Odou and Brinker (2014). Self-compassion was not significantly associated with depression, either directly or indirectly. This is not consistent with the CBPM and other empirical studies, which found significant direct and mediated relationships between self-compassion (which all used the SCS to measure self-compassion) and depression (e.g., Krieger et al., 2013; Van Dam et al., 2011). These differences may be due to the use of the HADS-D to measure depression in the present study, and studies such as Krieger et al. (2013) and Van Dam et al. (2011) using the 21-item Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) to measure depression. Several studies have raised concerns regarding the validity of the HADS-D in terms of its assessment of depression (Cameron, Crawford, Lawton, & Reid, 2008; Reddy, Dunbar, Ford, & Philpott, 2010). The HADS-D also has a restricted range (7-items) when compared to the BDI-II, which can lead to reduced correlations, thereby appearing to provide poor evidence of relationships between variables when compared to the BDI-II (Furr, 2017). The BDI-

II may therefore potentially be a more valid and sensitive measure of depression (Cameron et al., 2011). Future studies, which attempt to measure the relationship between self-compassion and depression, may therefore benefit from measuring depression with the BDI-II rather than the HADS-D.

#### 3.4.4 Acceptance

Acceptance was found to be significantly associated with anxiety both directly, and indirectly when mediated through rumination and worry. These findings concur with the CBPM based on Grabovac et al. (2011) and Lloyd and Hastings' (2008) longitudinal analysis that found that increased acceptance may be a predictor of anxiety, and Coffey et al. (2010), who in a large correlational study of undergraduate students, found that acceptance of emotional experiences was related to improved anxiety symptoms. Acceptance was not found to be significantly associated with either depression or wellbeing, directly or indirectly. This does not support the CBPM, based on Grabovac et al. (2011) or the empirical study of Coffey et al. (2010), which found that acceptance of emotional experiences, was related to improved depression and wellbeing. The difference between the results of the present study and Coffey et al. (2010) may be due to the different outcome measures used in both studies. Coffey et al. (2010) used the 6-item depression subscale of the Brief Symptom Inventory (BSI; Derogatis 1983). As already outlined, concerns have been raised about the validity of the HADS-D in measuring depression (Cameron et al., 2008; Reddy et al., 2010). The BSI may be a more valid measure of depression and this may account for the differences between these two studies. The differences between the present study and Coffey et al. (2010) with relation to wellbeing may be

due to the fact that they used the Satisfaction with Life Scale, which measures subjective wellbeing and not psychological wellbeing (SWLS; Diener et al., 1985).

#### 3.4.5 Non-attachment

Non-attachment was found to be significantly associated with both wellbeing and depression. These findings are in line with the CBPM, based on Grabovac et al. (2011), and the empirical findings of Coffey and Hartman (2008) and Sahdra et al. (2010) who found that lower levels of attachment significantly predict improved wellbeing and mood. This finding is further supported by a correlational study of 186 college students carried out by McIntosh and Martin (1992), which found that greater non-attachment predicted happiness. The idea that being a more non-attached person is likely to lead to a person having improved wellbeing and mood is also supported by the theories of Gross and Munoz (1995), Lazarus and Folkman (1984) and Weinstein et al. (2009) who hypothesize that having a less attached and more open stance may be associated with less negative appraisals of situations as stressful, which could then underpin decreases in depression and increases in wellbeing.

#### 3.4.6 Attention regulation and mindfulness

Attention regulation and mindfulness were not found to have any significant direct or mediated effects on wellbeing, anxiety or depression. These results were not expected and do not support the CBPM based on Grabovac et al. (2011). These results also do not support Barnes and Lynn (2010), Brown and Ryan (2003) and Van Dam et al. (2011) who found that the ability to regulate one's attention through decentering and increased mindfulness were likely to be important factors in the process of optimizing wellbeing, and the improvement of anxiety and depression. The



differences between the present study and both Barnes and Lynn (2010), Brown and Ryan (2003) and Van Dam et al. (2011) may be due to the different measurements used. The present study used the HADS-A (7-items) and HADS-D (7-items) to measure depression and anxiety. Barnes and Lynn (2010), Brown and Ryan (2003) and Van Dam et al. (2011) used the BDI-II (21 items) to measure depression. Brown and Ryan (2003) used the 20-item State Trait Anxiety Inventory (STAI; Spielberger, 1983) and Van Dam et al. (2011) used the 21-item Beck Anxiety Inventory (BAI; Beck & Steer, 1993) to measure anxiety. As outlined above in section 3.4.3 and 3.4.4, the restricted range of the HADS-D and HADS-A, coupled with potential issues in the HADS-D and HADS-A in the measurement of depression and anxiety may have led to reduced correlations in the present study, when compared to STAI, BAI and BDI-II which have larger ranges. The difference between the present study and Brown and Ryan (2003) appears to be due to the fact that they used a number of wellbeing measures (including the PWBS used in the present study) in order to measure wellbeing more broadly than it was measured in this study. The CBPM has a large number of domains within a complex model of interactions. This is necessary as it reflects the literature on mindfulness, which highlights the potential impact of a large number of mindfulness variables on the physical and mental health of a range of populations. The results from this study indicate that both attention regulation and mindfulness may be candidates for pruning from the CBPM model, in order to attain a more parsimonious explanatory model of psoriasis patient anxiety, depression and wellbeing. However, future studies, which attempt use the CBPM and measure the relationship between attention regulation, mindfulness and the anxiety, depression and wellbeing of psoriasis patients are required in order to confirm if this is the case. Such

studies may benefit from using the STAI, BAI and BDI-II to measure anxiety and depression due to their larger item ranges.

### 3.4.7 Theoretical implications

The most consistently articulated research gaps in the mindfulness literature are the need to identify what the most important mechanisms of mindfulness interventions are, and how these mechanisms influence changes in anxiety, depression and wellbeing (Batink et al., 2013; Gu et al., 2015; Montgomery et al., 2016; Ohlsson, 2014; Van der Velden et al., 2015). This study provides promising preliminary empirical support to the potential of the direct and mediated effect CBPM model, which is a hybrid model based on Buddhist and western psychology, as being a useful explanatory theory of psoriasis patient anxiety, depression and wellbeing. The CBPM potentially offers greater theoretical clarity to the mindfulness literature by investigating a number of mechanisms, which have received empirical support in chapter 2, in an integrative manner. This approach to supporting the theory of mindfulness mechanisms of action had been missing from the mindfulness literature, with this literature tending to test individual mechanisms or smaller component models, with either direct or mediated pathways but not both (Gu et al., 2015). The clarity that the CBPM offers, which could be an important contribution to the theory on mindfulness mechanisms of action, comes through the identification of the potential predictive role that changes in four of the six CBPM domains may have on the anxiety, depression and wellbeing of psoriasis patients through both direct and through the mediated pathways of reduced worry and/or rumination. The results from this study also indicate that further refinement of the CBPM could lead to further theoretical contributions to the literature. It may be that if attention regulation and

mindfulness are pruned from the model that a more parsimonious model with better explanatory potential may emerge. However, future studies are required in order to test the direct and mediated effects CBPM model to see if this is the case.

#### 3.4.8 Clinical implications

This study has two potential implications for the use of psychological interventions in a clinical context with psoriasis patients. This study provides preliminary evidence that suggests that should psoriasis patients engage with a psychological intervention, such as MBCT, which would have the potential to improve the CBPM domain and mediating variables, that they may experience improvements in their anxiety, depression and wellbeing. Another clinical implication may be that new interventions may be devised that focus on the statistical significant relationships identified in this study, e.g., an intervention which focuses on reducing aversion, due to its potential salutary relationship with anxiety, depression and wellbeing.

#### 3.4.9 Study limitations

This study has a number of limitations. A primary limitation of this study is that the direct and mediated CBPM model may be one of several possible models that fit the data equally well. The pattern of relationships among the variables is consistent with theoretical reasoning set out in the CBPM, but the data do not definitively prove that the relationships exist as they are presented in the model, despite the good fit between the model and the data (Schumacker & Lomax, 2016). The use of purposive and convenience sampling (which are non-probability sampling approaches) reduces the extent to which the studies results can be generalised to a larger population of

psoriasis patients (Unrau & Grinnell, 2011). The use of 2 data collection points within a repeated measures design, means that was conclusions with regard to causality cannot be asserted (Kazdin, 2007; Mathieu & Taylor, 2006). In order to overcome this limitation, future research utilizing longitudinal designs measuring the direct and mediated variables in this study should be employed. The CBPM domain, mediating and outcome variables were solely assessed using self-report measures, which may limit the validity of the results (Chiesa, 2013; Grossman, 2011). The measurement of psychological phenomena using questionnaires always imports some error in measurement into the relevant variable scores (Wu & Zumbo, 2008). The use of path analysis in this study means that these studies were conducted with measurement errors which may have attenuated the strength of the associations found, with this measurement error likely to have resulted in overestimate of the effect of the independent variable on dependent variable and underestimate of the effect of a mediator on a dependent variable (Judd & Kenny, 1981). This study used the most appropriate and well-validated questionnaires available to measure each CBPM domain, mediating and outcome variable. However, the large number of questionnaires, and items used to measure the CBPM's variables relative to the sample size may have decreased the power of this study to detect significant differences. In addition, the too low an item: sample size ratio can result in spurious findings from statistical analyses. Ideally in multivariate analyses, the goal is to have high ratio of participants to items to ensure that the findings are robust. The current study sample size may have been too small relative to the overall number of items assessed.

The validity of questionnaires in the assessment of everyday mindfulness has

also been called into question, due to concerns over the interpretation of mindfulness items (Chiesa, 2013; Grossman, 2011). The study administrator was on hand throughout the data collection phase of this study, however participants potentially filling in questionnaire items without consulting the data collector, which they were unsure on the interpretation of, or did not know the meaning of cannot be ruled out. The use of qualitative interviews in future as part of a mixed methodology may ameliorate this limitation. Interviews of this nature would allow research participants to have a greater opportunity to explore their interpretations of mindfulness questionnaires, their experiences of everyday mindfulness and its impact on their mood and/or wellbeing.

#### 3.4.10 Future research

Future research, which endeavors to investigate potential mechanisms through which mindfulness might exert its beneficial effects would benefit from replicating this CBPM model with other dermatology patients, e.g. patients with eczema due to the high levels of anxiety, depression and poor wellbeing experienced by this patient group (Montgomery et al., 2016). Further research replicating the CBPM model is needed to establish the validity and reliability of the CBPM over time and across clinical and nonclinical populations.

#### 3.5 Conclusion

In conclusion, using a CBPM as a theoretical framework, this study aimed to provide a greater understanding of the individual differences in the wellbeing, anxiety and depression of psoriasis patients. This study provided promising preliminary evidence for a direct and mediated effect CBPM as being a potentially useful

explanatory framework of variation in psoriasis patient anxiety, depression and wellbeing. This study's results also suggest that non-attachment, aversion, acceptance and self-compassion could potentially have a direct effect on the wellbeing, anxiety and depression of psoriasis patients, and an indirect effect through reduced worry and rumination. This study provides preliminary evidence that should psoriasis patients engage in psychological interventions, which have the capacity to improve one or more of the CBPM domain and mediating variables, that they may accrue improvements in their anxiety, depression and wellbeing.

**Chapter 4:** Effects of Mindfulness-based Cognitive Therapy on CBPM domain, mediating and outcome variables: results from a randomized controlled trial with psoriasis patients.

#### 4.1 Introduction

As outlined in chapter 1, psoriasis patients report experiencing high levels of depression (ranging from between 10% and 33%) (Fortune et al., 1997a; ISF, 2015; Kimball et al., 2011; Schmitt & Ford, 2007), anxiety (ranging from 7% to 48%) (Fleming et al., 2017). In addition, psoriasis patients experience low levels of wellbeing (ranging from 77% to 88%; Armstrong et al., 2012; Dubertret et al., 2006). In order to support the biopsychosocial adjustment of psoriasis patients, a single, relatively brief and cost effective programme such as MBCT, that could potentially be expected to improve psoriasis, while enhancing the wellbeing and reducing anxiety and depression levels of patients, should be of value (Armstrong et al., 2012; Bundy et al., 2013). The SEM study in chapter 3 provided preliminary evidence that suggests that should psoriasis patients engage with a psychological intervention, such as MBCT, which would have the potential to improve the CBPM domain and mediating variables, that improvements in their levels of anxiety, depression and wellbeing may accrue as a result. The research literature on the use of MBCT with psoriasis populations is scant however, and more studies are required in order to establish if this is a suitable intervention for this patient group. The research literature on the use of mindfulness interventions has called for higher quality studies in the form of RCTs on the impact of MBCT on physical and mental health outcomes to be carried out. This PhD chapter will aim to build on chapter 3, and fill these research gaps by carrying out an RCT to investigate the impact of MBCT on the CBPM's domain (acceptance,

attention regulation, self-compassion, mindfulness, aversion, non-attachment), mediating (worry and rumination) and outcome variables (anxiety, depression and wellbeing) along with self-reported psoriasis.

#### 4.1.1 Aims of the current study

This study has two aims: (1) to investigate the effectiveness of MBCT on self-reported psoriasis, anxiety, depression and wellbeing, and (2) examine if MBCT is effective in improving the six CBPM domains (mindfulness, attention regulation, acceptance, self-compassion, non-attachment and aversion) and two mediating variables (worry and rumination) of the CBPM theory.

#### 4.1.2 Research hypotheses

This study will test a number of hypotheses:

H<sub>1</sub>: self-reported psoriasis, depression, anxiety, wellbeing, acceptance, mindfulness, self-compassion, aversion, non-attachment, attention, rumination and worry for psoriasis patients who engage in an MBCT intervention will improve significantly after intervention (post intervention and 3 months hence) when compared to a group of psoriasis patients who engage in treatment as usual (TAU).

#### 4.2 Methods

The move toward evidence-based practice throughout the Western world has led to a renewed focus on randomized controlled trials (RCTs) as a means of establishing impact (Brady & O'Regan, 2009). Within this design, participants completed self-report scales pre-intervention (t<sub>1</sub>), post-intervention (t<sub>2</sub>) and 3 months later (t<sub>3</sub>).



#### 4.2.1 Sample

The study was carried out in a dermatology clinic in a general hospital in Ireland. The study population consisted of psoriasis patients recruited from this dermatology clinic, and through advertisements in a national newspaper and the Irish Skin Foundation's website. Patients who expressed an interest in the study were contacted via telephone for assessment to check for availability during the study period and likelihood of meeting inclusion and exclusion criteria. Inclusion criteria for this study were: adults over 18 years of age with a diagnosis of mild to severe psoriasis. Exclusion criteria were: patients deemed unsuitable for MBCT after psychological assessment by the trial administrator due to recent bereavement, experiencing current psychotic symptoms or having a diagnosis of Bipolar Disorder, and patients who had previously participated in a formal 8-week mindfulness programme. Ethical approval was sought and granted from the ethics committee of the School of Psychology in Trinity College, Dublin and from the Ethics Committee of the hospital involved in the study (see Appendix 1 for approval letters). In order to attain informed consent, an information sheet about the purpose of the study was provided to each participant to sign. The information sheet explained how the data would be used, what participation would require of each potential participant, gave assurances on confidentiality and anonymity (which was attained by omitting the names of the research participants and the hospital setting when reporting data and keeping records of any interactions) with the proviso that the participant could withdraw from the study at any time (see Appendix 3 for this study's protocol). The trial was conducted and reported in accordance with the CONSORT guidelines (Schulz et al., 2010).

#### 4.2.2 Randomisation

Participants were randomised to continue with their usual psoriasis treatment (treatment as usual waiting list control condition - TAU) or to receive 8 weeks of MBCT in addition to their usual psoriasis treatment in a 1:1 ratio. The randomization sequence was generated in blocks as participants entered the study using computer-generated numbers. Randomisation was stratified according to gender. The trial administrator informed participants of the randomization over the telephone. Eligible participants were invited for a detailed one-to-one explanation of the study procedures, and then took part in the baseline assessment. No masking of treatment condition took place.

#### 4.2.3 Procedures

##### 4.2.3.1 MBCT Intervention

The MBCT classes were run in 2 groups of 20 - 26 participants who met for 2 hours per week over 8 weeks. The sessions took place in a large open classroom situated in a general hospital in Ireland. An example of the weekly format along with the materials given to participants is contained in Appendix 6. Each session included guided meditation, experiential exercises and discussion. In MBCT, the concept of self-compassion is not explicitly explored or taught by facilitators in MBCT (Segal et al., 2002). Over 8 weeks, the other five CBPM domains and the two mediating variables of the CBPM are explicitly touched on and explained in the context of exploring the participant's experiences of each in the context of their meditative practice, e.g., the body scan or walking meditation (Segal et al., 2002). This occurs in weeks 1-6, with week 7 focusing on how to use the skills used in the intervention in a person's life, e.g., if a person is feeling low, what should they do, and week 8

focusing on how to keep their meditation practice going once the group coming to an end. In addition to the weekly group sessions, participants received CDs with guided exercises and were asked to complete daily homework exercises (including meditation practices and exercises to integrate the awareness skills into daily life) for at least 45 min per day, 6 days per week. These sessions were facilitated by formally trained MBCT facilitators with a number of years of MBCT facilitation experience. The programme followed the protocol for MBCT as outlined by Segal et al. (2002). The trial administrator observed all group sessions to ensure treatment fidelity.

#### 4.2.3.2 TAU

TAU consisted of any treatment the participant, their dermatologist or mental health care specialist regarded as necessary. Participants were encouraged to continue treatment they followed prior to enrolling in the study and advised that they were free to remain on or receive additional treatment or to change their (dose of) pharmacological medication during the study period.

#### 4.2.4 Measures

##### 4.2.4.1 CBPM outcome measures

The validity and reliability information for Ryff's Psychological Wellbeing scales and the Hospital Anxiety and Depression Scale is contained in chapter 3.2.3. Cronbach's alpha was .91 for the Ryff's Psychological Wellbeing scales and .78 for the HADS-D and .83 for the HADS-A subscales for this study.

##### 4.2.4.2 Self-reported psoriasis

The self-administered psoriasis area and severity index (SAPASI) is a structured instrument for measuring the severity of psoriasis (Feldman et al., 1996). The instrument consists of a silhouette of a body for patients to shade in affected areas and of three modified visual analog scales for recording the redness, thickness, and scaliness of an average lesion (Fleischer et al., 1996). It was designed with the aim to be quick and simple to be completed by people with no clinical training (Feldman et al., 1996). The SAPASI is comprised of two sections, the first instructs participants to colour in the areas on a mannequin (anterior and posterior aspects) where their psoriasis is active. The second is comprised of three visual analogue scales (VAS), which have six intersecting lines to demonstrate increasing severity. The three scales score redness (erythema), thickness (induration), and scaliness (desquamation). The rater first scored the four body areas (head, upper extremities, trunk and lower extremities) with the scores presented in Table 4-1.

**Table 4-1.**

SAPASI body surface area coverage scores.

Score	% Coloured in on the mannequin
0	None
1	<10%
2	11-30%
3	31-50%
4	51-70%
5	71-90%
6	91-100%

The score allocated to each body area was weighted (head x 0.1; upper extremities x 0.2; trunk x 0.3; lower extremities x 0.4). These weighted scores were summed to produce the total area of active psoriasis score. For each of the VAS the distance in millimetres (mm) from zero to the participant's intersecting mark was measured. These measurements were added together, divided by the length of the VAS, then multiplied by four. This result was multiplied by the total area score to give the final SAPASI score (Schmitt & Wozel, 2005). The scoring sheet can be found in Appendix 5.

The SAPASI's psychometric properties have assessed by comparison with the PASI, which has been used extensively in both clinical and research dermatology settings. The SAPASI has demonstrated high criterion validity by correlating significantly with all components of the PASI with an overall correlation of  $r = .59, p = .0001$ . Test re-test reliability found a correlation between the two time points of  $r = .82, p < .0001$  and inter-rater reliability between five raters was  $r = .95, p < .001$  (Feldman et al., 1996). Research has replicated the correlation between the SAPASI and PASI (Feldman et al., 1996).

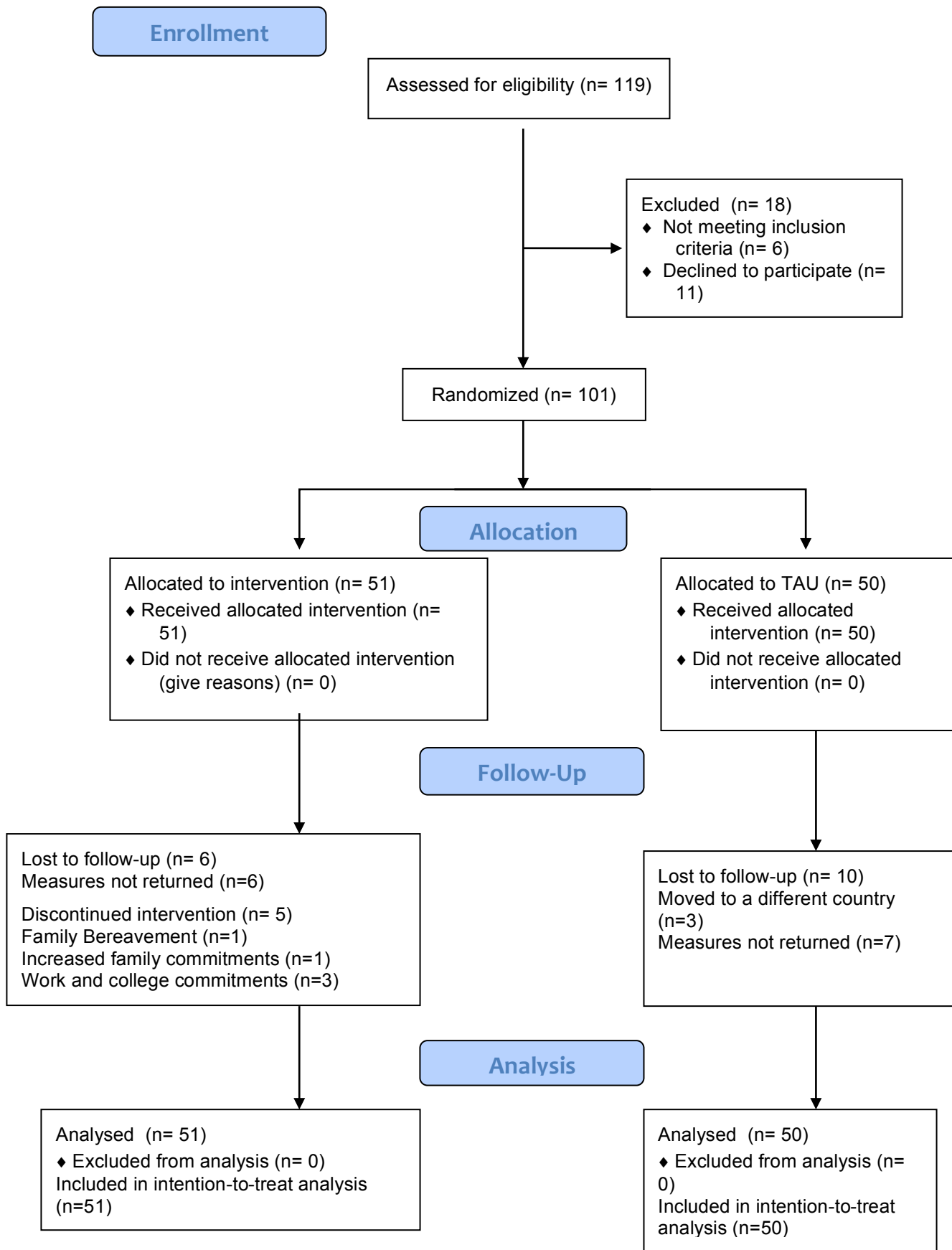
#### 4.2.4.3 CBPM domain and mediating variable measures

The validity and reliability information for the Philadelphia Mindfulness Scale (PMS), the Southampton Mindfulness Scale (SMS), the Experiences Questionnaire (EQ), the Non-Attachment Scale (NAS), Acceptance and Action Questionnaire –II (AAQ-II), Self-Compassion Scale (SCS), Rumination Reflection Questionnaire (RRQ) and the Penn State Worry Questionnaire (PSWQ) is contained in chapter 3.2.3. Cronbach's alpha was .84 for the PMS, .9 for the SMS, .88 for the EQ, .91 for the

NAS, .94 for the AAQ-II, .95 for the SCS, .94 for the RRQ and PSWQ for this study.

#### 4.2.5 Sample size

Power calculations using G-Power identified that in order for the study to have 95 % power in detecting a small to medium effect size ( $f = .17$ ) a sample of 92 (46/46) would be required. This study was powered to detect small to medium effects, as the literature on MBCT with clinical populations, and psychological interventions such as CBT on psoriasis, anxiety, depression and wellbeing generally report small to medium effects of these interventions.



**Figure 4-1.** Consort Diagram: enrollment and study flow in RCT of MBCT versus TAU.

#### 4.2.6 Statistical Analysis

The data were screened for missing values and any error cases, such as extreme outliers. There were no missing values on any of the primary outcomes. There were a maximum of two cases missing on some subscales for individual participants on the secondary outcomes. As these were such a small proportion of the overall dataset (n=101) and not from the primary variables of interest, mean replacement was used for the missing items.

Randomized assignment to intervention conditions is typically expected to minimize baseline differences between groups that could confound intervention outcome measurement. However, with relatively small group sample sizes, departure from such expectation may occur, and it is therefore important in such circumstances to compare baseline differences between groups during the analysis (Davidson & Kaszniak, 2015). In order to do so, this study used analysis of covariance (ANCOVA), as this method increases the power of RCTs by reducing any unintentional baseline differences due to random allocation, which increases a study's capacity to obtain a valid estimation of the intervention effect between groups (Fitzmaurice, Laird, & Ware, 2004; Senn, 1994). In order to retain balance in prognosis created by the random allocation outlined above, intention-to-treat analysis was also employed (Gupta, 2011). This allowed a pragmatic estimate of the benefit of the treatment under investigation, rather than of its potential benefit in patients who receive treatment exactly as planned to be attained (Gupta, 2011). No *p*-value adjustment was made for multiple comparisons, as controlling for Type 1 error in this manner is likely to increase the chances of Type 2 error (Rothman, 1990).



### 4.3 Results

The demographic and clinical characteristics of each group are shown in Table 4-2. There were considerably more females than males in both the intervention and control groups. The average age of both groups was similar at 43 and 45 years respectively. Both groups are evenly split on the type of medical interventions that participants were receiving at baseline. Topical treatments are applied to the skin and are often the first treatment recommended to a newly diagnosed person. Topicals can be purchased over the counter or by prescription (Menter et al., 2008). Systemic treatments are prescription drugs that are taken orally or by injection and work throughout the body. Systemic treatments are typically prescribed for moderate to severe psoriasis and psoriatic arthritis (Menter et al., 2008). Phototherapy or light therapy, involves exposing the skin to ultraviolet light on a regular basis under medical supervision. Phototherapy is administered in a doctor's office, psoriasis clinic or at home with a phototherapy unit (Menter et al., 2008). Biologic drugs, or biologics, are typically prescribed for moderate to severe psoriasis and psoriatic arthritis that has not responded to other treatments. Biologics are given by injection or intravenous (IV) infusion (Menter et al., 2008). Both groups had the same number of participants who were suffering from Psoriatic Arthritis. There were no systematic differences on demographic and clinical characteristics between those that dropped out of the trial and those that completed the trial. Chi-squared tests found that the percentage of females ( $\chi^2(1, N= 51) = .22, p = .64$ ), males ( $\chi^2(1, N= 51) = .22, p = .64$ ), those receiving topical treatment ( $\chi^2(1, N= 51) = .12, p = .73$ ), systemic treatment ( $\chi^2(1, N= 51) = .01, p = .94$ ), those receiving phototherapy ( $\chi^2(1, N= 51) = .28, p = .6$ ), biologics ( $\chi^2(1, N= 51) = .04, p = .39$ ), antidepressant medication ( $\chi^2(1,$

$N= 51) = .04, p = .39)$  and those who have a diagnosis of psoriatic arthritis ( $\chi^2 (1, N= 51) = .01, p = .94)$  did not differ between the intervention group trial completers and non completers. This was also the case for the groups of participants in the control group who completed the trial and those that did not. The percentage of females ( $\chi^2 (1, N= 50) = .29, p = .51)$ , males ( $\chi^2 (1, N= 50) = .29, p = .51)$ , those receiving topical treatment ( $\chi^2 (1, N= 50) = .01, p = .95)$ , sytematic treatment ( $\chi^2 (1, N= 50) = .38, p = .54)$ , those receiving phototherapy ( $\chi^2 (1, N= 50) = .001, p = .98)$ , biologics ( $\chi^2 (1, N= 50) = .08, p = .78)$ , psychotropic mediation ( $\chi^2 (1, N= 50) = .08, p = .78)$  and those who have a diagnosis of psoriatic arthritis ( $\chi^2 (1, N= 51) = .99, p = .32)$  did not differ between these two groups.

**Table 4-2.**

Demographics and clinical characteristics.

	MBCT group (n = 51)	Control Group (n = 50)
Age, years ( <i>M</i> [ <i>SD</i> ]) min-max	(43.51 [16.96]) 18-82	(44.56 [16.36]) 19-73
	n (%)	n (%)
Female	38 (75)	38 (76)
Male	13 (25)	12 (24)
Topical treatment	35 (69)	26 (52)
Systemic treatment	8 (16)	3 (6)
Phototherapy	2 (4)	5 (10)
Biologics	4 (8)	4 (8)
Antidepressants	4 (8)	4 (8)
Psoriatic Arthritis	14 (19)	36 (17)

The means and standard deviations for the CBPM domain, mediating variables and outcomes for both groups at baseline (t1) are shown in Table 4-3. The groups appear to be quite evenly matched on depression scores, with the intervention group appearing to have slightly higher levels of depression than the control group. Overall both group averages are in the normal range for HADS-D so the sample can be described as a sample with low levels of depression at baseline. The overall sample however seems to have reasonably high levels of anxiety, which is quite evenly matched across each group, with both groups averaging in the borderline abnormal anxiety range for the HADS-A measure. The control group appears to have been experiencing higher levels of wellbeing at baseline after random allocation. Independent samples t-tests found that there were no significant differences between those that stayed in the trial and those who dropped out in either group. In the intervention group, there were no significant differences on self-reported psoriasis ( $t(49) = -.87, p = .39$ ), anxiety ( $t(49) = -.33, p = .74$ ), depression ( $t(49) = -.84, p = .4$ ), wellbeing ( $t(49) = .68, p = .5$ ), acceptance ( $t(49) = -1.2, p = .24$ ), mindfulness ( $t(49) = .92, p = .36$ ), attention regulation ( $t(49) = .24, p = .81$ ), non-attachment ( $t(49) = .07, p = .95$ ), aversion ( $t(49) = -1.07, p = .29$ ), rumination ( $t(49) = -.02, p = .98$ ), worry ( $t(49) = .23, p = .82$ ) and self-compassion ( $t(49) = 1.55, p = .13$ ). In the TAU control group, there was no significant differences on self-reported psoriasis ( $t(48) = -1.34, p = .19$ ), anxiety ( $t(48) = -1.1, p = .28$ ), depression ( $t(48) = -1.7, p = .1$ ), wellbeing ( $t(48) = .131, p = .2$ ), acceptance ( $t(48) = -.94, p = .35$ ), mindfulness ( $t(48) = 1.2, p = .24$ ), attention regulation ( $t(48) = .46, p = .65$ ), non-attachment ( $t(48) = 1.64, p = .11$ ), aversion ( $t(48) = -1.88, p = .07$ ), rumination ( $t(48) = -.02, p = .12$ ), worry ( $t(48) = -.95, p = .35$ ) and self-compassion ( $t(48) = 1.42, p = .16$ ).

**Table 4-3.**

Means and standard deviations for the RCT groups at baseline, after treatment and 3 months post intervention.

	MBCT Group (n=51)		Control Group (n=50)	
	M	SD	M	SD
<b>SAPASI</b>				
Pre-treatment	11.39	8.15	10.22	7.94
Post-treatment	5.14	4.90	8.34	6.89
3 months post-treatment	5.79	6.32	6.83	6.33
<b>PWBS</b>				
Pre-treatment	178.29	24.16	186.72	25.54
Post-treatment	184.69	25.02	184.94	27.30
3 months post-treatment	184.47	23.32	185.28	27.08
<b>HADS-A</b>				
Pre-treatment	9.02	3.88	8.68	4.4
Post-treatment	7.51	3.87	8.42	4.08
3 months post-treatment	7.37	3.86	7.94	4.29
<b>HADS-D</b>				
Pre-treatment	4.45	3.23	4.1	3.49
Post-treatment	3.31	2.54	4.12	3.15
3 months post-treatment	3.06	2.57	4.1	3.03
<b>RRQ</b>				
Pre-treatment	41.61	9.69	41.26	10.03
Post-treatment	36.29	9.21	39.84	10.85
3 months post-treatment	36.39	9.48	40.82	10.07

PSWQ

Pre-treatment	53.53	13.84	53.04	14.85
Post-treatment	48.98	12.22	52.48	14.35
3 months post-treatment	48.39	13	51.90	14.63

PMS

Pre-treatment	31.88	7.22	31.98	7.52
Post-treatment	28.45	7.67	31.52	7.40
3 months post-treatment	29.57	7.29	31.26	7.65

SMS

Pre-treatment	44.02	16.11	50.80	15.36
Post-treatment	54.65	14.29	49.20	15.63
3 months post-treatment	52.16	15.98	49.48	16.56

EQ

Pre-treatment	40.57	7.96	44.08	8.48
Post-treatment	47.39	7.33	44.18	9.23
3 months post-treatment	47.37	9.13	44.34	8.09

NAS

Pre-treatment	125.35	20.38	126.68	20.15
Post-treatment	135.84	19.43	127.12	21.29
3 months post-treatment	133.88	19.84	127.76	20.56

AAQ

Pre-treatment	22.65	8.83	22.42	9.96
Post-treatment	19.80	8.42	22.56	9.05
3 months post-treatment	19.88	8.17	21.48	9.41

SCS

Pre-treatment	77.41	18.35	80.64	18.94
Post-treatment	83.39	18.09	81.44	20.30
3 months post-treatment	84.80	18.14	80.50	20.03

---

#### 4.3.1 CBPM outcomes

Psoriasis: The MBCT group showed a large significant reduction in SAPASI scores when compared to the TAU control group when baseline scores were controlled for at t2 (post intervention),  $F(1, 95) = 19.59, p < .001, \eta^2 = .17$ . This is based on Cohen (1988) who identified a partial  $\eta^2 = .01$  as a small effect,  $.06 =$  as a medium effect and  $.14 =$  as a large effect size. There was no significant group differences between the MBCT and control groups at t3 (3 months post intervention),  $F(1, 95) = 1.73, p = 0.19, \eta^2 = .02$ . *Post-hoc* tests showed a significant reduction of SAPASI scores from pre to post intervention in the MBCT group ( $M$  difference = 3.2 (95% CI = 0.81, 5.59),  $p = .01$ ) but not in the TAU control-group ( $M$  difference = 1.89 (95% CI = -0.116, 3.89),  $p = .07$ ).

Anxiety: The MBCT group showed a small to medium significant reduction in HADS-A scores when compared to the TAU control group when baseline scores were controlled at t2,  $F(1, 98) = 5.17, p = 0.02, \eta^2 = .05$ . There was no significant group differences between the MBCT and control groups at t3,  $F(1, 95) = 1.73, p = 0.191, \eta^2 = 0.02$ . The HADS-A scores were significantly reduced from pre to post intervention in the MBCT group ( $M$  difference = 1.49 (95% CI = .67, 2.31)  $p = 0.001$ ) but not in the TAU control-group ( $M$  difference = 0.26 (95% CI = -0.46, 0.98),  $p = .48$ ).

At baseline, 16 participants were in the normal range, 14 were in the

borderline abnormal range and 21 were in the abnormal range on the HADS-A. At t2 this had changed to 26 participants being in the normal range, 15 in the borderline abnormal range and 10 were in the abnormal range on the HADS-A. At t3 this had again changed to 27 participants being in the normal range, 12 being in the borderline abnormal range and 12 being in the abnormal range on the HADS-A. A McNemar-Bowker Chi-Square test showed that there was a statistically significant change among the MBCT group participants in these HADS-A categories from t1 to t2 ( $\chi^2(2) = 20, p < .001$ ), and from t1 to t3 ( $\chi^2(2) = 20, p < .001$ ).

Depression: When compared to the TAU control group, the MBCT group showed medium significant reductions in HADS-D scores when baseline scores were controlled at t2,  $F(1, 98) = 5.95, p = .02, \eta^2 = .06$  and t3,  $F(1, 98) = 8.62, p < .01, \eta^2 = .08$ . The HADS-D scores from pre to post intervention ( $M$  difference = 1.21 (95% CI = .33, 2.09)  $p = .008$ ) and from pre to 3 months post intervention reduced significantly in the MBCT group ( $M$  difference = 1.47 (95% CI = .56, 2.38),  $p = .001$ ). The TAU control-group HADS-D scores from pre to post ( $M$  difference = -0.2 (95% CI = -0.81, 0.41),  $p = 1.00$ ) and from pre to 3 months post intervention ( $M$  difference = -0.001 (95% CI = -0.81, 0.81),  $p = 1.00$ ) did not change significantly.

At baseline, 42 participants were in the normal range, 6 were in the borderline abnormal range and 3 were in the abnormal range on the HADS-D. At t2 this had changed to 48 participants being in the normal range, 1 in the borderline abnormal range and 2 were in the abnormal range on the HADS-D. At t3 this had again changed to 47 participants being in the normal range, 4 being in the borderline abnormal range and 0 being in the abnormal range on the HADS-D. McNemar-Bowker Chi-Square

tests showed that there was no statistically significant difference among the MBCT group participants in these HADS-D categories from t1 to t2 ( $\chi^2(2) = 4, p = .14$ ), or from t1 to t3 ( $\chi^2(2) = 2, p = .16$ ).

Wellbeing: The MBCT group showed a small to medium significant increase in PWBS scores when compared to the TAU control group when baseline scores were controlled at t2,  $F(1, 98) = 5.64, p = 0.02, \eta^2 = 0.05$  but not at t3,  $F(1, 98) = 3.33, p = .07, \eta^2 = 0.03$ . *Post-hoc* tests showed a significant increase in PWBS scores from pre to post intervention in the MBCT group ( $M$  difference = 6.39 (95% CI = 2, 10.78),  $p < .001$ ) but not in the TAU control-group from pre to post ( $M$  difference = -0.04 (95% CI = -0.81, 0.73),  $p = 1.00$ ).

#### 4.3.2 CBPM domains

Acceptance: When compared to the TAU control group, the MBCT group experienced medium significant reductions in acceptance scores on the PMS (indicating an increase in acceptance) when baseline scores were controlled at t2,  $F(1, 98) = 8.612, p = .004, \eta^2 = 0.08$ . There was no significant group differences between the MBCT and control groups at t3,  $F(1, 98) = 2.38, p = .13, \eta^2 = .02$ . The MBCT group showed significant reductions in acceptance scores from pre to post intervention in the MBCT group ( $M$  difference = 3.43 (95% CI = 1.64, 5.22),  $p < .01$ ) but not in the TAU control-group from pre to post ( $M$  difference = 0.46 (95% CI = -1.03, 1.95),  $p = 1.00$ ).

Mindfulness: The MBCT group showed a large significant increase in SMS scores when compared to the TAU control group when baseline scores were



controlled at t2 (post intervention),  $F(1, 98) = 21.79, p = .00, \eta^2 = .18$ , and a medium significant increase at t3,  $F(1, 98) = 10.79, p < 0.001, \eta^2 = 0.10$ . *Post-hoc* tests showed a significant reduction of SMS scores from pre to post intervention in the MBCT group ( $M$  difference = 10.63 (95% CI = 6.74, 14.52),  $p < .01$ ) and from pre to 3 months post intervention ( $M$  difference = 8.137 (95% CI = 4.4, 11.88.),  $p < .01$ ) but not in the TAU control-group from pre to post ( $M$  difference = 1.6 (95% CI = -1.528, 4.73),  $p = .63$ ) and from pre to 3 months post intervention ( $M$  difference = 1.32 (95% CI = -2.47, 5.11),  $p = 1.00$ ).

Self-Compassion: When compared to the TAU control group, the MBCT group showed medium significant reductions in SCS scores when baseline scores were controlled at t2,  $F(1, 98) = 6.97, p = .01, \eta^2 = 0.07$ , and t3,  $F(1, 98) = 15.88, p < .01, \eta^2 = 0.14$ . The MBCT group showed a significant increase in SCS scores from pre to post intervention ( $M$  difference = 5.98 (95% CI = 2.72, 9.24),  $p < .01$ ) and from pre to 3 months post intervention ( $M$  difference = 7.4 (95% CI = 4.24, 10.54)  $p < .01$ ). The TAU control-group pre to post SCS scores did not change significantly ( $M$  difference = 0.8 (95% CI = 1.42, -3.02),  $p = 1.00$ ) or from pre to 3 months post intervention ( $M$  difference = -0.14 (95% CI = -2.16, 2.44)  $p = 1.00$ ).

Aversion: The MBCT group showed medium but significant reductions in aversion scores when compared to the TAU control group when baseline scores were controlled at t2  $F(1, 98) = 10.20, p < 0.01, \eta^2 = .094$ , but not at t3,  $F(1, 98) = 3.41, p = 0.07, \eta^2 = .03$ . *Post-hoc* tests showed a significant reduction of aversion scores from pre to post intervention in the MBCT group ( $M$  difference = -2.84 (95% CI = -1.42, -

4.26)  $p = 0.00$ ) and but not in the TAU control-group from pre to post ( $M$  difference = -0.14 (-1.88, 1.6),  $p = 1.00$ ).

Non-attachment: When compared to the TAU control group, the MBCT group showed large significant increases in NAS scores when baseline scores were controlled at t2,  $F(1, 98) = 18.70$ ,  $p < .01$ ,  $\eta^2 = .16$ , and medium to large increases at t3,  $F(1, 98) = 9.86$ ,  $p < .01$ ,  $\eta^2 = .13$ . *Post-hoc* tests showed a significant increase in non-attachment scores from pre to post intervention in the MBCT group ( $M$  difference = 10.5 (95% CI = 6.67, 14.32),  $p = .00$ ) and from pre to 3 months post intervention ( $M$  difference = 8.53 (95% CI = 4.99, 12.07),  $p < .001$ ) but not in the TAU control-group from pre to post ( $M$  difference = -0.44 (95% CI = 2.97, -3.9),  $p = 1.00$ ) and from pre to 3 months post intervention ( $M$  difference = -1.08 (95% CI = 2.94, -5.1),  $p = 1.00$ ).

Attention: The MBCT group showed a large significant increases in attention regulation scores when compared to the TAU control group when baseline scores were controlled at t2,  $F(1, 98) = 20.56$ ,  $p < .01$ ,  $\eta^2 = .17$ , and medium significant increases at t3,  $F(1, 98) = 9.86$ ,  $p < .01$ ,  $\eta^2 = .09$ . The MBCT group showed significant increases in attention regulation scores from pre to post intervention ( $M$  difference = 6.82 (95% CI = 4.55, 9.1),  $p < .01$ ) and from pre to 3 months post intervention ( $M$  difference = 6.8 (95% CI = 4.04, 9.57),  $p < .01$ ). The TAU control-group attention regulation scores from pre to post ( $M$  difference = -0.10 (95% CI = -1.50, 1.7),  $p = 1.00$ ) and from pre to 3 months post intervention did not change significantly ( $M$  difference = -0.26 (95% CI = -1.69, 2.21),  $p = 1.00$ ).

#### 4.3.3 CBPM mediating variables

Rumination: When compared to the TAU control group, the MBCT group showed medium to large significant reductions in rumination scores when baseline scores were controlled at t2,  $F(1, 98) = 12.99, p < .001, \eta^2 = .12$ , and large significant reductions at t3,  $F(1, 98) = 20.43, p < .001, \eta^2 = .17$ . *Post-hoc* tests showed a significant reduction of rumination scores from pre to post intervention in the MBCT group ( $M$  difference = 5.31 (95% CI = 3.50, 7.16),  $p < .001$ ) and from pre to 3 months post intervention ( $M$  difference = 5.216 (95% CI = 3.35, 7.09),  $p < .001$ ). The TAU control group rumination scores did not change significantly from pre to post ( $M$  difference = 1.42 (95% CI = -0.103, 2.94),  $p = .08$ ) and from pre to 3 months post intervention ( $M$  difference = 0.44 (95% CI = -0.92, 1.8),  $p = 1.00$ ).

Worry: The MBCT group showed a medium significant reduction in worry when compared to the TAU control group when baseline scores were controlled at t2,  $F(1, 98) = 8.15, p < .001, \eta^2 = .08$ , and t3,  $F(1, 98) = 7.021, p < .001, \eta^2 = .07$ . *Post-hoc* tests showed a significant reduction in worry scores from pre to post intervention in the MBCT-group ( $M$  difference = 4.55 (95% CI = 2.07, 7.03),  $p = .001$ ) and from pre to 3 months post intervention ( $M$  difference = 5.137 (95% CI = 2.63, 7.64),  $p = 0.00$ ) but not in the TAU control-group from pre to post ( $M$  difference = 0.56 (95% CI = -1.42, 2.53),  $p = 1.00$ ) and from pre to 3 months post intervention ( $M$  difference = 1.14 (95% CI = -1.16, 3.44),  $p = .68$ ).

#### 4.4 Discussion

The present study investigated the effects of MBCT on self-reported psoriasis, anxiety, depression, wellbeing, acceptance, mindfulness, self-compassion, aversion, non-attachment, attention, rumination and worry in a randomized controlled trial with

psoriasis patients. The ANCOVA results revealed that when controlling for baseline scores that the MBCT intervention group achieved a range of small to large significant effects across the CBPM domain, mediating and outcome variables when compared to the control group post intervention. These between group effects held at t3 for depression, rumination, worry, mindfulness, self-compassion, attention regulation and non-attachment. The results from this RCT indicate that MBCT is an effective intervention in improving the CBPM outcomes of self-reported psoriasis, anxiety and wellbeing in the immediate term, and may also be effective for improving depression in the short term. The small to medium significant effects found on the anxiety, depression and wellbeing of the psoriasis patients in this study are consistent with the findings of a number of RCTs, systematic reviews and meta-analyses on the impact of mindfulness interventions (either MBCT or MBSR) on these outcomes with other clinical and non-clinical populations. This literature has typically found that MBCT has a small to medium effect on wellbeing (Bolier et al., 2013; Pots et al., 2014), anxiety (Bohlmeijer et al., 2010; Goyal et al., 2014; Hofman et al., 2010; Pots et al., 2014) and depression (Bohlmeijer et al., 2010; Bolier et al., 2013; Goyal et al., 2014; Hofman et al., 2010; Pots et al., 2014).

The findings that MBCT had significant small to medium effects on the anxiety and psychological wellbeing, a significant medium effect on depression and worry, and a large significant effect on the mindfulness of psoriasis patients differs from the results of D'Alton et al. (2018). They reported that MBCT had a small effect on these variables and found no statistically significant differences on the effects of a number of MBIs (including MBCT) on these variables relative to TAU alone at post-treatment, 6- or 12-month follow-up. The differences between this study's results and

D'Alton et al. (2018) on the effects of MBCT on these variables may have been due to the differences in the severity of psoriasis and the levels of worry, anxiety and depression experienced by both samples at baseline. D'Alton et al. (2018) also used the HADS to measure anxiety and depression, and the PSWQ to measure worry. Of note, D'Alton et al. (2018) differed in its exclusion criteria, in that any person with a score greater than 10 ( $>10$  = abnormal range on the HADS: Zigmond & Snaith, 1983) on both subscales was not permitted entry to their trial. This criterion led to the participants in D'Alton et al. (2018) having lower levels of anxiety and depression compared to the samples in the present study, potentially leading to a floor effect being present in D'Alton et al. (2018). The present study used more liberal exclusion criteria. For example, the 21 participants in the MBCT group who were in the abnormal range for anxiety on the HADS-A who would have been excluded from D'Alton et al. (2018) were allowed entry to this trial. This meant the present sample as a whole were in the borderline abnormal range for anxiety at baseline, which allowed more room from MBCT to be effective at improving the anxiety symptoms of this group. This is evidenced by the McNemar-Bowker Chi-Square tests on the HADS-A, which indicated that the participants in abnormal range on the HADS-A at baseline moved to the borderline abnormal and normal ranges on the HADS-A post intervention at t3. In both the intervention and control group, 8% of the participants were taking antidepressants and 8% were also undergoing biologic treatments. Biologic treatments, in a double blind placebo-controlled randomized controlled trial, were found to significantly decrease the depression scores of 618 psoriasis patients without clinical depression (Tyring et al., 2006). The levels of depression of the participants in this RCT at baseline may thus have been reduced due to the treatments they were receiving for their psoriasis and their mental health prior to entry. This may

have impacted on the MBCT intervention's capacity to improve the depression symptoms of the intervention group due to increased floor effects. The sample in D'Alton et al. (2018) at baseline were in the normal range for worry on the PSWQ; the sample in the present study was in the high worrier category on this measure at baseline (PSWQ >/45) (Meyer et al., 1990). The higher worry levels experienced by participants in the current study may have allowed more room for MBCT to be effective. The fact that D'Alton et al. (2018) also only had power to detect medium effects may also explain the differences between the non-significant effects found in their study and the small to medium significant effects found on anxiety and wellbeing in this study. D'Alton et al. (2018) used a different measure of mindfulness (Five Facet Mindfulness Questionnaire; Baer et al., 2006) than was used in the present study. D'Alton et al.'s (2018) finding that MBCT did not significantly affect mindfulness is not in line with the research literature on impact of MBCT on any other patient group. D'Alton et al. (2018) note that the FFMQ may be an insensitive outcome measure, and highlighted concerns, which have mounted over recent years over the sensitivity of the FFMQ in detecting treatment effects (Malinowski et al., 2017). Thus, it may be deficiencies in the measures that were used in their study that may account for the differences between their results and that of the present study with respect to MBCT's impact on mindfulness.

This study's results also differ from Fordham et al. (2015), who carried out the only other RCT examining the effectiveness of MBCT on psoriasis patients distress scores, using the HADS-A and HADS-D as a single score. In this pilot RCT, Fordham et al. (2015) found that MBCT did not improve psychological distress in psoriasis patients. The different results between the RCT in this PhD and Fordham et al.'s

(2015) ( $N = 29$ ) study may also be due to the fact that Fordham et al. (2015)'s study was not sufficiently powered to detect small to medium effects. Their study also suffered from a very high attrition rate (45%) with only six participants completing the MBCT intervention. The inability of Fordham et al. (2015)'s study to detect an effect was, much like D'Alton et al. (2018), is likely to have been compounded by the low levels of psychological distress existing within the study population at baseline, demonstrating a floor effect.

The finding that MBCT had a large significant effect on self-reported psoriasis severity at t2 is in line with Fordham et al. (2015) who in a pre-post RCT design, also found that MBCT had a small significant effect on self-reported psoriasis severity (also using the SAPASI to measure psoriasis severity) relative to those in a TAU control group. The differences in effect sizes between Fordham et al. (2015) and the present study may be accounted for by the differences between psoriasis severity scores of the patients at baseline in the two studies. The baseline mean of patients in the MBCT group was 5.94 in Fordham et al. (2015) and 11.39 in the present study. The higher effect of MBCT on psoriasis severity in the present study may have been due to the higher psoriasis severity in the present study's sample. The finding that MBCT would have a significant effect on psoriasis is also in line with Kabat-Zinn et al. (1998) who found that MBSR versus a control group statistically significantly improved skin clearing rates in psoriasis patients. The present study differs with D'Alton et al. (2018) which did not find that MBCT has a significant effect on psoriasis severity. The sample in D'Alton et al. (2018) were experiencing mild psoriasis at baseline and the authors identified that potential floor effects may have limited the extent to which MBCT may have impacted psoriasis symptoms in their

study.

There are no systematic reviews and meta-analyses on the impact of mindfulness interventions on the CBPM domain and mediating variables of any clinical or non-clinical group. There are also only a few small scale RCTs investigating the impact of mindfulness interventions on these variables in studies of patients with depression. By meditating and engaging in the mindfulness practices regularly, it appears that the MBCT participants in this study may have developed increased capacities in each CBPM domain and mediating variable. This is evidenced by the small to large significant effects found across these variables in this study. These results are consistent with the findings of the aforementioned small scale RCTs, which found that MBCT has medium to large effect on the mindfulness (Kuyken et al., 2008; Labelle et al., 2010; van Aalderen et al., 2012); a medium sized effect on self-compassion (Kuyken et al., 2008); medium to large effects on attention regulation (Bieling et al., 2012; Hargus et al., 2010); small to medium effects on acceptance (Bedard et al., 2014); a medium to large effect on rumination (Labelle et al., 2010; van Aalderen et al., 2012) and medium effects on the worry levels of these participants (Batink et al., 2013; van Aalderen et al., 2012).

No such studies have been carried out on attachment and aversion, as these are Buddhist constructs, which are quite new to the western psychological literature on mindfulness. The small to large effects found on these domains are supported by the original BPM theory (Grabovac et al., 2011), which hypothesised that mindfulness practice would improve these domains. The significant improvements found in self-reported psoriasis, depression, anxiety and wellbeing in this study, may be due to



these improvements in the CBPM domains directly, and/or through the mediated relationships of reduced worry and rumination. This would be in line with the direct and mediated effects CBPM SEM model, which was found to be a good fit to the data of a large cohort of psoriasis patients in chapter 3. Further studies, both quantitative and qualitative, are needed to further explore the key mindfulness mechanisms by which improvements in self-reported psoriasis, anxiety, depression and wellbeing accrue. Chapters 5 and 6 of this PhD will attempt to help fill this research gap.

This RCT study highlights the suitability of delivery of MBCT to psoriasis patients who were within this study's liberal inclusion and exclusion criteria. The majority of the psoriasis patients in the RCT study attended most of the mindfulness classes and the low attrition rate (7% at t2) is an indication of their relevance to the patients. This study's results mean that if replicated using independent samples in different contexts, then MBCT could be added to the set of clinical interventions that mental health professionals use to support the physical and mental health of psoriasis patients, particularly those who suffer from anxiety and depression issues and poor wellbeing. Thus, both dermatologists and mental health professionals should be prepared to talk with their patients about the potential role that MBCT could have in addressing their anxiety, depression and wellbeing issues.

As outlined in chapter 1, good quality research on the use of psychological interventions with psoriasis patients is sparse. This makes the direct comparisons of the effects of the MBCT with the effects found by psychological interventions such as CBT, on self-reported psoriasis, anxiety, depression and wellbeing more difficult. Based on the limited evidence against which to compare, the large significant effects

of MBCT in this study on self-reported psoriasis were in line with Lavda, Webb, and Thompson (2012) in a meta-analysis of the effect of psychological interventions including CBT, psychotherapy and behavioral interventions on psoriasis symptoms. Lavda et al. (2012) found that these interventions had medium effects (Hedges  $g = .51$ ) on psoriasis symptoms, however the confidence interval for this estimate ranged from a low to a large effect size (95% CI: .25, .77).

The small to medium significant effects of the MBCT on anxiety and medium effects on depression were in line with, but smaller than the effects found by Fortune et al. (2002) ( $N = 93$ ) in a case-control designed study, which is the highest quality study available to compare against. This study evaluated the effectiveness of a 6-week CBT programme on the anxiety and depression of patients using the HADS. This study found that there was a net mean difference of a decrease in 3 points on the HADS-A and 4 points on the HADS-D (exact scores and effect sizes not reported) experienced by the intervention group versus a TAU control group post intervention. This compares favorably with a 1.5 reduction in the HADS-A and a 1.1 decrease on the HADS-D experienced by the MBCT group versus the TAU control group in this study. The difference in effects may be due to the higher anxiety levels (abnormal mean average on the HADS-A) and depression levels (borderline abnormal mean average on the HADS-D) experienced by the participants in Fortune et al. (2002) at baseline. This may have allowed a larger improvement in both to occur post CBT intervention, than was experienced by the MBCT group in the RCT which were experiencing borderline abnormal levels of anxiety and normal levels of depression at baseline. Conversely, it is also plausible that this study population may be more responsive to CBT than MBCT. CBT has a far larger evidence base than MBCT,

based on a larger number of RCTs of a higher methodological quality. Based on the limited nature of the research with which to compare, it is reasonable to conclude, that given the current evidence base, including the evidence found in this thesis, that CBT should remain the front line psychological treatment for psoriasis, anxiety and depression. However, MBCT does have promise and may be a useful adjunct intervention for psoriasis patients in improving their psoriasis, anxiety, depression and wellbeing. MBCT could be offered as an option in a stepped care treatment approach, where CBT therapists could refer clients to MBCT groups when a course of CBT has or is about to be completed (Vollestad et al., 2011). Given the fact that both depression and anxiety can both recur after recovery, there is also a potential that MBCT could constitute a relapse-prevention strategy, akin to what is suggested by the NICE guidelines that currently recommend MBCT against depressive relapse (National Institute for Clinical Excellence, 2004). There is also potential that in future, based on the clearer picture of the mechanisms of mindfulness offered by the CBPM, that MBCT may be refined as an intervention or a new CBPM focused intervention may be developed, which may in time be more effective than both MBCT and CBT in improving psoriasis symptoms and the psychological symptoms associated with psoriasis.

This study had a number of strengths. An RCT design, the gold standard method to produce reliable results with minimum bias, with ANCOVA was used to examine the change between the treatment and control group from before, after and 3 months after the MBCT intervention. This is the most conservative approach thus further reducing bias (Van Breukelen, 2006). This study had a low risk of selection bias due to adequate random sequence generation by a third party (Higgins, 2011).

This study also had a larger sample size than any previous study with psoriasis patients, and sufficient power for the analysis of group by time effects. The attrition rate of (7% at t2 and 20% at t3) in this study is also lower than the attrition rate experienced by previous but similar intervention studies on the use of psychological interventions with psoriasis patients. For example, D'Alton et al. (2018) had 15% attrition post treatment and 35% after a six-month follow up. Forty-five percent of the participants left Fordham et al. (2015) and 25% of participants left a study examining the effectiveness of a group CBT intervention with psoriasis patients (Fortune et al., 2002). The risk of attrition bias due to the loss to follow-up on this study's validity is limited, as no significant differences between trial completers and non-completers in both groups across the demographic, clinical and measures of the CBPM domain, mediating and outcome variables were found. The minimum effective dose of MBCT has been defined as attendance at four or more sessions (Crane et al., 2014; Teasdale et al; 2000). In this study, 90% of participants in the MBCT group received at least this dosage. The gender stratification, high response rate, wide age range and the use of different course instructors across the two groups also enhanced the external validity of this study.

Even though this study's findings may have clinical significance, they are associated with some important limitations. One limitation concerns the absence of an active control group or placebo. Due to limited funding availability, this study used a TAU control group rather than a more appropriate active control group e.g. CBT conducted in a similar group setting. The absence of an active control group of this nature means that we cannot exclude the possibility that the effects observed in this study may be due to non-specific factors, such as receiving attention, being part of a

credible treatment programme, or group-related factors. This also means that the improvement experienced by the intervention group (who self-selected for inclusion to this study) on each CBPM, domain, mediating and outcome variable, being in part due to the fact that they expected to improve, rather than due to the actual impact of the MBCT intervention cannot be ruled out. The MBCT intervention occurred in a supportive group environment with a trained MBCT facilitator. The impact of this environment, in which participants could share and learn from each other and have a positive social experience is another important confounding variable that can impact on MBCT's effect. In light of this study's results, in order to move the psychological literature on the use of mindfulness with psoriasis patients forward, further RCT research exploring the impact of MBCT on the CBPM domain, mediating and outcomes using an active comparison control group e.g. versus a CBT intervention group, is thus needed in order to ameliorate these potential confounding issues. Due to the nature of the intervention, both participants and assessors were not blind to treatment conditions. As a result, detection or performance biases could have affected the self-report outcome measures (Higgins, 2011). The internal validity of the RCT may also have been reduced due to testing effects. In this study, participants were measured on three occasions and participants may have become more competent in filling in the measure due to practice effects. The lack of objectively rated psoriasis could be considered a study limitation; however, there is good correlation between the PASI and SAPASI so this is a minor study limitation (Bundy et al., 2013).

The MBCT group facilitators had been trained to deliver the course and had extensive experience in running MBCT groups prior to the trial commencing. Each group facilitator had also received regular supervision in the two years prior to the

groups commencing. This supervision was conducted in line with the Irish Good Practice Guidelines for Teaching Mindfulness-Based courses (Irish Network for Mindfulness-Based Teachers, 2015). This training and supervision provides a degree of reassurance about treatment fidelity. The trial administrator who is a professionally qualified social worker with experience facilitating mindfulness groups, trained as an MBCT facilitator prior to the groups commencing. The trial administrator then attended each session in order to ensure treatment fidelity in both MBCT groups, providing some minimal level of reassurance about treatment fidelity. However, no independent assessment of the facilitator's skills and adherence to the MBCT protocol were employed. This study also did not contain MBCT competence and adherence measures. This means that the extent to which participants were using the mindfulness practices as taught was not measured, meaning the changes in outcomes may be due to other factors. Reporting of treatment fidelity in empirical studies on mindfulness and behavioral interventions is not standard practice and is an important weakness in this research (Kechter, Amaro, & Black, 2018). No treatment fidelity tools for MBIs were available at the time that this study was undertaken (Kechter et al., 2018). However, adequately monitoring and reporting treatment fidelity when reporting efficacy outcomes allows for assessment of whether observed treatment effects in an empirical trial are attributable to the intervention delivered (Carroll et al., 2007; Leeuw, Goossens, de Vet, & Vlaeyen, 2009). The limited nature of the assessment and reporting of treatment fidelity in the RCT is a major limitation of this study, which limits the reliability and validity of the results from the RCT (Carroll et al., 2007; Leeuw et al., 2009). In order to overcome this limitation in future, studies of this nature should use the Treatment Fidelity Tool for MBIs, developed by Kechter et al. (2018) since the RCT in this thesis was undertaken. This tool allows researchers to

conduct and then report treatment fidelity in a simple and standardized format through the use of a 15-item checklist. Each checklist item allowing researchers to consistently assess and report on each treatment fidelity component (study design, facilitator training, intervention delivery, participant receipt of the intervention and enactment of skills and strategies in real life setting). This reporting practice will enhance MBI interpretability and integrity in future (Kechter et al., 2018).

#### 4.5 Conclusion

This study found that MBCT is a feasible adjunct intervention to improve psoriasis severity, anxiety, depression and wellbeing. This study also highlighted how MBCT can improve the domain, mediating and outcome variables of the CBPM. Further studies on the key mechanisms by which these changes occur are required, and chapters 5 and 6 of this PhD contain studies, which will attempt to fill some of this research gap.

**Chapter 5:** MBCT as a clinical intervention with psoriasis patients through the lens of the clinically modified Buddhist Psychological model: a qualitative study.

## 5.1 Introduction

The literature outlined in chapter 1 on the chronic burden of psoriasis, and in chapter 2 on MBCT's effectiveness and its potential mechanisms of action was mainly quantitative in nature. The importance of quantifying the burden of psoriasis, investigating how changes in the anxiety, depression and wellbeing may accrue, along with identifying if MBCT is an effective intervention at improving these outcomes provided the rationale for the use of quantitative methods in chapters 3 and 4. The use of quantitative methodologies alone however may limit the extent to which researchers can attain a complete picture of how engaging in a mindfulness intervention may help to improve psoriasis symptoms and the wellbeing, anxiety and depression of patients (Grossman, 2011). The RCT in chapter 4 was limited in its inherent inability to provide insights into participants' contextual and subjective perspective on if, how and why the MBCT intervention worked (Verhoef, Casebeer, & Hilsden, 2002). The use of qualitative methods in this thesis, may ameliorate this limitation, through the exploration of the experience of participants who received the highest dose of the MBCT intervention in chapter 4 using semi-structured interviews (Creswell & Plano Clark, 2011). The collection of rich, dynamic and personal narratives from participants who received the highest dose of mindfulness training may enhance the understanding of the psychological mechanisms and processes associated with mindfulness meditation (Grossman, 2008; Moss, Reibel, & Greeson, 2015). Larger doses of mindfulness interventions have been identified as potentially producing larger overall effects on mindfulness variables, e.g., attention regulation,



pre-post mindfulness training (Baer 2003; Goyal et al., 2014). The higher dose of mindfulness training is likely to lead to participants having more frequent experiences of the impact of changes in the CBPM domains, e.g., increased self-compassion, on their daily lives. Having such experiences may allow participants an enhanced capacity to explore and articulate how these mechanisms may have improved their psoriasis symptoms, distress and/or wellbeing (Grossman, 2008; Moss, Reibel, & Greeson, 2015). From this, further evidence regarding the CBPM as an explanatory framework of changes in anxiety, depression and wellbeing of psoriasis patients may be attained (Pope & Mays, 1995). Incorporating the use of qualitative methods would also allow broader and more exploratory research questions to be asked of the MBCT participants (Bryman, 2006; Creswell & Plano Clark, 2011). These questions are likely to allow MBCT participants a greater capacity to explore and better articulate their experience of the intervention, any positive or negative effects it had, and its impact on their daily life (Bryman, 2006; Creswell & Plano Clark, 2011).

Qualitative studies of other chronic conditions, which may suffer from publication bias due to the almost universal positive findings found, highlight the benefits of mindfulness meditation on a number of health and mental health outcomes. To identify the effects of mindfulness meditation on older adults with chronic low back pain, Morone, Lynch, Greco, Tindle, and Weiner (2008) conducted a qualitative study based on grounded theory and used content analysis of diary entries from 27 older adults. These participants had participated in a clinical trial of a slightly modeled 8-week MBSR meditation programme. Morone et al. (2008) found several themes reflecting the beneficial effects of mindfulness meditation on pain, attention, sleep and wellbeing. Using semi-structured interviews, Kvillemo and Branstrom

(2011) examined the perceived effects and experiences of mindfulness stress-reduction training as described by 19 patients with cancer who participated in a MBSR training programme. The majority of the participants in this study expressed a number of perceived positive effects of participating in the mindfulness programme including increased calm, enhanced sleep quality, more energy, less physical pain, and increased wellbeing. However, a few participants experienced no effect. In a feasibility study of an 8-week mindfulness meditation training for military combat veterans ( $N = 16$ ) at a community mental health agency, Stankovic (2011) found that despite continued challenges with mental focus and intrusive memories, participants who completed the intervention reported reduced rage, anxiety, emotional reactivity, and increased feelings of relaxation, peace, self-awareness, and self-efficacy.

There is limited qualitative research that has explored potential mechanisms of mindfulness, which may explain changes in physical and mental health outcomes of clinical and non-clinical populations. In a qualitative study with 9 oncology patients who had completed an MBSR intervention, MacKenzie, Carlson, Munoz, and Speca (2007) used semi-structured interviews and grounded theory analysis to develop a theory concerning mechanisms whereby MBSR effects change for cancer patients. MacKenzie et al. (2006) found that participants reported that adding mindfulness to their lives led to personal growth through: improved self-control, framing their disease more positively, being more open to change and responding in more beneficial ways when coping with their illness. Hoffman et al. (2012) used a nested qualitative thematic analysis of short proformas completed by 92 breast cancer patients evaluating the effectiveness of MBSR. They found that participants reported: being calmer, centred, at peace, connected and more confident, seeing the value of

mindfulness practice, being more aware, coping with stress, anxiety and panic, accepting things as they are, being less judgemental of myself and others, improved communication and personal relationships, and making time and creating space for myself as being the most important factors in their improved sense of wellbeing.

Hugh-Jones, Rose, Koutsopoulou, and Simms-Ellis (2018) used in-depth, semi-structured interviews and grounded theory with 21 employees of a higher education institution who had completed an eight-week intervention based on MBSR. Hugh-Jones et al. (2018) found that participants reported that enhanced attentional capacity, increased legitimization of self-care, detection of stress markers, perceiving choice and recovering self-agency were important factors in attaining increased wellbeing.

Colgan, Wahbeh, Pleet, Besler, and Christopher (2017) used semi-structured interviews to explore and compare the subjective experiences of 102 veterans with posttraumatic stress disorder (PTSD) who were randomly assigned to 1 of 4 arms: (a) body scan, (b) mindful breathing, (c) slow breathing, or (d) sitting quietly. Six core themes emerged from analysis of participant responses across the 4 groups.

Participants reported enhanced present moment awareness, increased nonreactivity, increased nonjudgmental acceptance, decreased physiological arousal and stress reactivity, increased active coping skills, reduced hypervigilance, which lead to reduced PTSD symptoms, including greater relaxation, reduced anger and increased sleep.

Individual interviews and focus groups among 65 outpatient war veterans with PTSD who enrolled in a mindfulness-based mantram repetition programme carried out by Bormann, Hurst, and Kelly (2013) found that participants identified 11 potential mechanisms of change that helped to improve their PTSD symptoms. These were relaxing and calming down, letting go of negative feelings, thinking more clearly and rationally, diverting attention away from triggering events, focusing

attention, dealing with sleep disturbances, coming back from flashbacks, slowing down, communicating thoughts and feelings more effectively, feeling in touch spiritually, and letting go of physical pain.

There has been very limited qualitative research carried out in the mindfulness literature studying psoriasis patients' lived experience of the burden of psoriasis and how engaging in a mindfulness intervention may help manage this burden. Only one qualitative study on the impact of a mindfulness intervention on psoriasis patients exists. Fordham et al. (2015) ( $N = 9$ ) used semi-structured interviews to explore the acceptability and usefulness and MBCT intervention with a group of chronic plaque psoriasis patients. They found no agreement as to whether practising mindfulness affected the symptoms of psoriasis. Some participants claimed to observe an improvement in the appearance of their psoriasis while others reported no change but did notice a change in their reactions towards their condition. Fordham et al. (2015) felt that the increased cognitive and behavioural control over their reactions to psoriasis symptoms, articulated by some of the participants, might have contributed to the improved sleep and greater energy that some participants reported. Fordham et al. (2015) also reported that participants felt calmer, more confident and sociable, suggesting improved self-efficacy in dealing with social interactions. Overall, Fordham et al. (2015) found that MBCT was an acceptable and useful adjunct intervention for people with psoriasis. No published qualitative research exists that has explored what psoriasis patients themselves feel are the psychological mechanisms and characteristics of mindfulness, which may have impacted their psoriasis, wellbeing, anxiety and depression levels.

### 5.1.1 Study aims

This study aims to explore the experience of psoriasis patients who have completed and received the highest dose of an MBCT intervention through the theoretical lens of the CBPM.

### 5.1.2 Research questions

- (1) Do the MBCT participants feel that they experienced positive or negative changes in their lives as a result of completing the intervention?
- (2) If changes occurred, what do the MBCT participants feel are the reasons for these changes?

## 5.2 Methods

### 5.2.1 Study Design

In order to answer the research questions, a qualitative research design was chosen and a constructivist ontological position was taken by the researcher (Creswell & Plano Clark, 2011). The qualitative data were collected with semi-structured interviews from psoriasis patients who had just completed an MBCT intervention. These interviews focused on the impact of MBCT intervention on the participants' day-to-day lives. The CBPM was used to guide the analysis of the interview data, from which confirming and disconfirming qualitative evidence of the CBPM was sought.

### 5.2.2 Participants

The interview data were obtained from ten participants from the MBCT group in the randomized controlled trial in chapter 4. Chapter 4.2.3 provides detail of the

MBCT group format. All of the interview participants were of a Caucasian background and their ages ranged from 24 to 73 ( $M$  age = 46 years), 7 were female and 3 were male. This study's research participants were selected through purposive sampling, along with snowball sampling. In order to interview the participants who received the highest dose of mindfulness, those who attended at least 7 of the 8 weeks of the MBCT course were selected as the participants ( $N = 10$ ). An invitation was offered to them during the last week of their MBCT programme. The participants returned an informed consent form to the researcher, who then arranged a time and place for the interview to take place. The interviews all took place within 2 weeks of the group ending. More details on the inclusion and exclusion criteria for the RCT, from which this study's sample was derived, can be found in Chapter 4.2.1.

### 5.2.3 Qualitative interview procedure

The qualitative data for this study was collected by the trial administrator from chapter 4 via open-ended semi-structured interviews, varying in length between 35–75 minutes. The qualitative interviews were summative and retrospective. They took place after the intervention and after the quantitative data collection was completed at  $t_2$  in the RCT in chapter 4. The interview required the participants to reflect upon experiences in and after the MBCT group had taken place. Using the CBPM as a guiding conceptual framework, whilst following the recommendations outlined by Padgett (1998), the interview schedule was designed with careful attention to wording questions in a manner that would promote the disclosure of participants' beliefs instead of eliciting simple confirmation of the CBPM, e.g., "*After completing the MBCT programme, have you noticed any differences in your ability to focus your attention or concentrate?*" The full interview schedule for this study is contained in

Appendix 5. These questions were used as prompts to stimulate discussion on how learning different mindfulness practices during the MBCT intervention impacted their day-to-day lives. The interview schedule was viewed as a heuristic device to facilitate an inductive exploration of participants' potential experiences of the CBPM's relationships. The interview schedule was reviewed by Dr. Andrea Grabovac (lead author of the original BPM) prior to the interviews taking place in order to ensure that the language used in the interview schedule maximized its capacity to capture the CBPM components should they be present. Interviewees answered questions and elaborated on themes and issues related to what they learned from the MBCT intervention. Throughout the interview, the interviewer was aware to avoid imposing preconceived theoretical notions on the interviewees. With this in mind, explicit questions on whether changes in participants' anxiety, depression or wellbeing occurred due to the use of mindfulness techniques learned in the group were not asked. This approach acknowledged how the stance of the researcher can inadvertently shape interview responses, and consequently eschews the imposition of *a priori* theorizing on interview responses by promoting a stance of openness and curiosity (Ercikan & Roth, 2006).

#### 5.2.4 Ethics review

Ethical approval was sought and granted from the ethics committee of the School of Psychology in Trinity College, Dublin and from the Ethics Committee of the hospital involved in the study (see Appendix 1 for approval letters). In order to attain informed consent, an information sheet about the purpose of the study was provided to each participant to sign (see Appendix 3 for this study's protocol).

### 5.2.5 Data analysis

The interview data were analysed using directed qualitative content analysis (Hsieh & Shannon, 2005) and the principles of framework analysis (Ritchie & Spencer, 1994). Research using qualitative content analysis focuses on the characteristics of language as communication with attention to the content or contextual meaning of the text (McTavish & Pirro, 1990). Qualitative content analysis goes beyond merely counting words to examining language intensely for the purpose of classifying large amounts of text into an efficient number of categories that represent similar meanings (Weber, 1990). The main strength of a directed approach to content analysis is that existing theory can be refuted, supported and/or extended (Hsieh & Shannon, 2005). The main strength of using framework analysis is the transparency and increased rigor it can offer as it can be better adapted to research that has specific questions, a limited time-frame, a pre-designed sample and uses an a priori theoretical framework (Ritchie & Spencer, 1994). Each interview was read repeatedly for the researcher to become familiar with the content and identify key issues and emergent themes (Stage 1 – familiarization). The direct and mediated effect CBPM was then used as an a priori (thematic) framework (Stage 2 – identifying a thematic framework). In order to develop this framework, operational definitions set out for each variable were determined in chapter 2 and 3, and each individual relationship set out in the CBPM were used as potential codes (Hsieh & Shannon, 2005). The themes identified in Stage 1 were added as subthemes to the primary themes identified in the a priori framework template or included as additional primary themes (Ritchie & Spencer, 1994). All primary themes and subthemes were given e.g. approach coping oriented, to create a coding framework, which was then applied to all the transcripts systematically (Stage 3 – indexing). Data were then extracted from the transcripts and sorted by primary theme and subtheme in a word document (Stage 4 -



charting). During the latter stages, thematic associations and patterns were recorded (Stage 5 – mapping and interpretation) (Ritchie & Spencer, 1994). An independent reviewer with qualitative research experience reviewed stages 4 and 5 of the data analysis, in order to reduce potential bias and enhance the rigor of this study.

### 5.3 Results

The demographic and clinical characteristics of this sample are shown in Table 5-1. There were considerably more females than males in this group, with a large proportion of the participants undergoing treatment for their psoriasis upon entry to the MBCT intervention.

**Table 5-1.**

Baseline demographics and clinical characteristics.

Sample Characteristic	Interview Participants (n = 10)
Age, years (M [SD]) min-max	(48.4 [15.41]) 24-74
	n (%)
Female	7 (70)
Male	3 (30)
Topical Treatment	4 (40)
Systemic Treatment	4 (40)
Phototherapy	3 (30)
Biologics	4 (40)
Psoriatic Arthritis	3 (30)

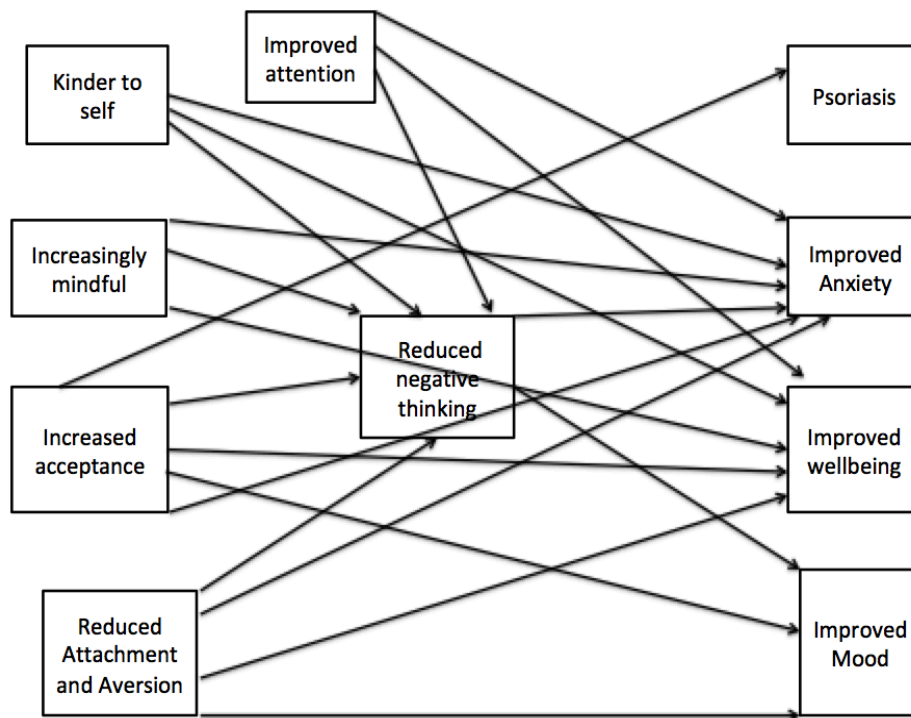
Directed qualitative content and framework analysis of the 10 qualitative

interviews derived 3 predominant themes: (1) enhanced approach oriented coping skills, (2) reduced negative thinking, and (3) improved mental and physical health. Super-ordinate and sub-ordinate themes are outlined in Table 5-2, and are described, interpreted and illustrated by the transcript excerpts below. The manner in which these themes are causally connected is represented in Figure 5-1 below.

**Table 5-2.**

Summary of interview themes.

Superordinate Themes	Subordinate Themes
(1) More approach coping oriented	<ul style="list-style-type: none"> <li>• Increasingly mindful</li> <li>• Improved attention regulation skills</li> <li>• Reduced attachment and aversion towards difficult thoughts and emotions</li> <li>• Increased capacity for acceptance</li> <li>• Kinder to self</li> </ul>
(2) Reduced negative thinking	<ul style="list-style-type: none"> <li>• Less rumination</li> <li>• Less worry</li> <li>• Improved anxiety</li> </ul>
(3) Mental and physical health improvements	<ul style="list-style-type: none"> <li>• Improved mood</li> <li>• Improved wellbeing</li> <li>• Mixed opinions on changes in psoriasis</li> </ul>



**Figure 5-1.** Causal connections between the themes derived from the semi-structured interviews.

*(1) More approach coping oriented*

*Increasingly mindful:* All 10 participants reported improvements in the extent to which they felt more mindful in their day-to-day lives after completing the MBCT intervention. Participants reported that being more connected to the present allowed them to reduce the extent to which they may have been worrying or ruminating about an issue from their past or in the near future. This process appears to have allowed participants to approach difficult thoughts and feel difficult emotions, which then allowed these thoughts and emotions to pass naturally. Of the 10 participants, 7 reported that increased mindfulness allowed them to feel less anxious generally. A smaller number of participants noted improvements in mood and wellbeing as a result of being increasingly mindful.

*I am definitely thinking less...like before my little child and wife would be*

*playing and laughing and I am just not part of it...I am kind of in my own world, maybe worrying or anxious about something. Now I...take a deep breath and I'm back with them (Participant 1).*

*If something was hard to shake it off...several thoughts would maybe come in and would interrupt. Whereas I find myself now being able to, not brush them aside, invite thoughts in and then just let them pass. I am less anxious about them then (Participant 2).*

*Improved attention regulation skills:* Out of the 10 interview participants, 9 reported the development of enhanced attention regulation skills as a result of having taken part in the MBCT programme. Participants reported that through consistent mindfulness practice that they noticed an improved capacity to regulate their attention. The group participants highlighted that this capacity helped them to be able to shift their attention from negative thoughts about a situation in their lives, and to observe these as thoughts and not facts. This process allowed participants to let these thoughts go instead of passively worrying or ruminating about their content.

*I'm terrible for letting my mind wander...say something is worrying me, now when that happens, I give myself a minute or two to let it wander, it passes...then I can just go back and focus on the task at hand (Participant 6).*

*I think your mind isn't as busy when you come out of a meditation...you can focus on what's happening now.... you can calm down the, 'I need to, I should have, why didn't I'. I'm focusing and taking more in now (Participant 4).*

*Reduced attachment and aversion to difficult thoughts and emotions:* all 10 participants noted that after they meditated that they noticed they tended to allow

difficult thoughts and emotions to come into awareness and let them remain there without any effort to avoid them. This allowed these difficult thoughts and emotions to arise and pass. Some participants identified that by doing so they worried and/or ruminated less. Other noted that they felt an improved mood along with reduced stress and anxiety as a result of relating differently to their thoughts and emotions in this way.

*The negative thoughts are always harder to dismiss...they are much more persistent... now I stop and sit with what is making me feel negatively... sometimes I use the breathing exercise to unpick myself...to let it go as it's not important. I don't overthink and feel better then (Participant 5).*

*I had parked thoughts and emotions completely....not in a good way... now I let the feelings happen, I don't avoid them... I feel sad. And then I say, right, that's done. It's quite amazing, how I feel afterwards (Participant 10).*

*Increased capacity for acceptance:* of the 10 interview participants, 7 reported feeling better able to accept difficult thoughts and emotions, particularly those relating to their psoriasis. Participants noted that becoming more aware that all thoughts and emotions are short-lived was supportive in allowing this increased acceptance to manifest. Participants again noted that this increased acceptance reduced the extent to which they experienced negative thoughts.

*Being more open about my psoriasis. It helps... before, it was a cover up trying to avoid acknowledging its burden...to acknowledge the sadness and accept my psoriasis now... it's so powerful and gives me power back (Participant 7).*

*I am more accepting of experiences as they happen now, so I think less about them (Participant 6).*

*More compassion for self:* All 10 participants reported experiencing increased self-compassion after they used the mindfulness techniques learned in the group. Participants noted that by perceiving themselves in a more positive light, this reduced the extent to which they needed to avoid negative thoughts about themselves following a difficult experience.

*...rather than saying to myself, why did you do that or you shouldn't have said that... The voices are definitely more 'you're doing as much as you can' ...I'm not as harsh on myself now (Participant 7).*

*If something went wrong, before I would have been very critical of myself...I would have been ashamed...and now it's the total opposite (Participant 8).*

## (2) Reduced negative thinking

The 10 interview participants reported that when they consistently used their mindfulness techniques, they found their thought processes were less cluttered and more positive generally. Individual participants tended to highlight the importance of different CBPM approach coping strategies after meditation, e.g., being more mindful or self-compassionate, as being important in supporting this capacity to approach rather than avoid their thoughts. Participants identified that this led to decreased negative thinking through reductions in the extent to which they either worried or ruminated.

*Less rumination:* all 10 participants reported decreased levels of rumination post MBCT intervention. Of these 10 participants, 8 reported improved wellbeing, 4 reported decreased anxiety and depression with 3 participants reporting an increased capacity to cope with their psoriasis due to the reduced rumination experienced.

*Before, I'd have a hundred things going on in my head at once. I am more*

*accepting now, I can now let negative thoughts go...it was very helpful in terms of clearing all that excess stuff out of your mind, you feel better (Participant 6).*

*Now I am in the present more, my mind is quieter now. I don't overthink things from the past anymore... (Participant 2).*

*Less worry:* of the 10 interview participants, 6 reported reductions in their tendency to worry post MBCT intervention. Of these 6 participants, each participant reported that reduced worry led to improved wellbeing. Five participants reported how reduced worry led to them feeling less anxious, with 1 participant reporting improved mood as a result of a reduced tendency to worry.

*I don't think I'm as worried about things after I meditate, or if I am worrying..., there is not as much cloud, it is not as grey (Participant 1).*

*Now that I am kinder to myself, my thinking is a lot less jumbled up and it's a lot less negative... I don't worry about every little decision...it makes a lot of things easier and I feel more positive (Participant 9).*

### (3) Mental and physical health improvements

*Changes in psoriasis:* Of the 10 interview participants, 5 reported that they felt that participating in the MBCT group had a positive impact on their psoriasis symptoms, with the other 5 explicitly stating that they felt that the intervention had no effect. Of the 5 participants who felt that it had an effect, 4 felt that that their psoriasis was stress related and that by reducing their overall stress as part of the group they felt that their psoriasis had improved. Three of these 4 believed that their psoriasis improved because they had been more accepting of their psoriasis, which allowed them to reduce the subjective stress it caused them. None of the participants felt that

MBCT would cure their psoriasis.

*The course has had a positive effect on my psoriasis, because if my thought processes are right and if it was always being triggered by stress, the fact that I've cut that right down, I think that's why it hasn't flared up since (Participant 4).*

*Yeah, it's got a lot better. I think because of the acceptance that it's not going to go away. I think deep down I wanted a cure... and every time it came back...it was upsetting...now I just accept it and get on with it (Participant 7).*

*Improved mood:* During the interviews, explicit questions on depression or mood were not asked of participants. Of the 10 participants, 3 noted that through regular mindfulness practice, and the approaching of difficult thoughts and emotions with acceptance, along with less attachment and aversion, they found that their mood had improved.

*...there was times when I'd get really down and wouldn't realise why. I'd missed something, or avoided dealing with something. Now I deal with it, let the thoughts and emotions in and I don't feel down like before (Participant 1).*

*I thought I'd won 2000euro on the bookies lottery, but when I checked the ticket I realised I hadn't...before I would have been down for days. I wasn't this time, I was able to deal with the disappointment, by just focussing on the negative feeling and letting it go (Participant 2).*

*Improved anxiety:* though no explicit questions on changes in anxiety post MBCT intervention were asked, 7 participants still reported that they felt that participating in the MBCT group had a positive impact on their anxiety levels.



Participants again noted that after meditating they felt it was easier to tolerate anxious feelings before allowing them to pass.

*It definitely made me face up to things more...I remember having to make a phone call to a parent that I really didn't want to make after school one day and I was thinking and getting so anxious about it. So I stopped, took a breath and made the call instead of allowing it to linger and I felt better (Participant 5).*

*The pain in the stomach and the sickness... I don't feel it anymore. I would have had a lot of anxiety, and I'm not feeling that way now.... I'm not afraid, I'm in the moment more (Participant 9).*

*Improved wellbeing:* even though no questions on changes in wellbeing were asked of the interview participants, all 10 participants reported improved levels of wellbeing after practicing mindfulness consistently. Different participants identified either improvements in one or more of the CBPM approach oriented domains after meditation, e.g., being more accepting, as being the main reason for this improvement in wellbeing.

*I think my wellbeing is better. I'm happier because I'm more accepting and not as easily irritated or as stressed. Slowing down my thought processes, and then giving myself time to let things go, that's helped me quite a lot (Participant 3).*

*I'm certainly feeling a lot calmer and I am taking more time for myself, for example... I'd stop on a walk now and try and enjoy the walk now mindfully.... that's been wonderful (Participant 8).*

#### 5.4 Discussion

There is very limited qualitative literature available that explores the impact of

being a part of an MBCT intervention has on psoriasis patients' physical and mental health. The study aimed to help fill this research gap by exploring the positive and negative experiences of psoriasis patients' due to being a part of an MBCT intervention. This study did so by using the CBPM as a theoretical framework with which to understand any changes in the physical and mental health of a group of psoriasis patients who completed at least 7 out of the 8 weeks of the MBCT intervention in chapter 4. This sample was selected as they were more likely to have received the highest dosage of mindfulness, and it was felt that interviewing these participants would allow a deeper exploration of their experience of mindfulness mediation and its impact on their everyday lives. This section will now discuss the important findings from this study, this study's strengths, its limitations and the potential for future research.

#### 5.4.1 Approach coping

During the interviews, in a manner consistent with Moos' (2002; 1984) theory of coping, outlined in chapter 1, participants consistently articulated how learning mindfulness exercises and then practicing them consistently led to them becoming more approach oriented rather than avoidant in how they dealt with difficult situations, thoughts and emotions in their daily lives. Participants reported using different types of approach oriented coping strategies in their daily lives, including: being more mindful, accepting, kinder to oneself, better regulating their attention, being less attached and averse when faced with difficult situations, thoughts and emotions. This is consistent with the findings in chapter 4 which found that MBCT improves these CBPM domains at t2, and the processes set out in the CBPM based on Grabovac et al. (2011). The fact that these findings are in agreement with the findings

in chapter 4 is expected due to the high dose of mindfulness training this group experienced. These participants identified that these approach oriented strategies allowed them to modify their appraisal of difficult situations, thoughts and emotions in a manner that is consistent with the theories of Arch and Landy (2015), Gross and Munoz (1995) and Lazarus and Folkman (1984) outlined in chapter 1. Participants identified that after the MBCT intervention that they felt that they had an increased capacity to accept, tolerate, regulate, and recover from negative emotions triggered by an aversive experience. Participants noted that the use of the approach-oriented strategies outlined above allowed decreased negative and increased the benign cognitive appraisals of these difficult experiences to take place. This group of MBCT participants noted that reduced stress that they experienced as a result of this change in coping style allowed for improvements in their wellbeing, anxiety and mood. This process is consistent with the Lazarus and Folkman's (1984) transactional theory of stress and coping. This finding is also consistent with the qualitative findings of Colgan et al. (2017) who identified that the increased use of what they described as 'active coping' led to improved PTSD symptoms including increased relaxation, sleep and reduced anger. The finding that the change in coping style, identified in this study, could have a positive impact on mental health and wellbeing could be particularly relevant to psoriasis patients more generally. Avoidance and passive coping has been identified as being common in psoriasis patients (Bundy et al., 2013). O'Leary et al. (2004) identified that one third of psoriasis patients have been found to suffer from pathological worry and anxiety, with avoidance behavior being the main contributing factor in retaining the stress this causes leading to patients suffering persistent stress. The mental health and wellbeing of psoriasis patients more generally could therefore be enhanced through the development of the mindful approach

oriented coping strategies used by the participants in this group after engaging in an MBCT intervention.

#### 5.4.1.1 Increased mindfulness

The data from the interviews highlighted that the consistent practice of the mindfulness techniques learned in the group, allowed participants an enhanced ability to allow negative thoughts about the past or future to arise and pass without mental proliferation occurring. This is consistent with the CBPM based on Grabovac et al. (2011) and the results from the RCT in chapter 4. This increased ability to be more mindful allowed participants to connect more with what they were doing or how they were feeling in the present moment, in a manner that is consistent with the theoretical ideas behind MBSR and MBCT programmes as presented by Kabat- Zinn (1990) and Segal et al. (2002). A large proportion (70%) of this sample noted that this led to feeling less anxious generally in their day-to-day lives. This is consistent with the RCTs of O'Doherty et al. (2015) and Vøllestad et al. (2011) who identified that improvement in mindfulness due to participation in an MBI (MBCT and MBSR respectively) was significantly associated with improved anxiety.

#### 5.4.1.2 Improved attention regulation skills

In the qualitative interviews, consistent with the CBPM theory, and the qualitative interview findings of Bormann et al. (2013) and Morone et al. (2008), participants highlighted how through consistent mindfulness practice that they felt that they had improved their capacity to regulate their attention through decentering. Participants consistently reported being able to switch their attention effectively from unpleasant, worried, anxious or ruminative thinking to selectively attend to more

pleasant experiences. This helped to optimize their emotional experience in the present moment and enhanced their wellbeing. This finding is in line with the papers on the potential impact that decentering could have on mental health outcomes by Barnes and Lynn (2010), Compton, (2000), Ellenbogen et al. (2006) and Wadlinger and Isaacowitz (2011) outlined in chapter 1. This finding is supported by the qualitative findings of Hugh-Jones et al. (2018) who also found that an enhanced attention regulation capacity was an important factor in the enhanced wellbeing of 21 higher education employees. Participants in the interviews in the current study also reported that they regulated their attention by taking a moment to gather their thoughts and focus on what was happening or what they were doing in the moment. The process allowed participants to reduce the extent to which they worried or ruminated. This is consistent with Teasdale et al. (1995) who proposed that if cognitive resources are deployed to focus on the present moment this decreases the resources available for ruminative processing.

#### 5.4.1.3 Reduced attachment and aversion

Participants articulated how consistent mindfulness practice allowed them to feel a reduced aversion and attachment to difficult thoughts and emotions. Participants identified how this reduced the extent to which they worried or ruminated which led to improvements in wellbeing and mood. These findings are consistent with traditional Buddhist writings, outlined in the theory papers of Kumar (2003) and Wallace and Shapiro (2006) that wellbeing is improved by reducing tendencies towards aversion and attachment to internal and external phenomena, which facilitates adaptive emotional regulation. This finding is also in line with a number of studies, which outline that avoidance and over-engagement/attachment with thoughts and

emotions is associated with worse psychological outcomes including increases in anxiety and reductions in wellbeing (Gross, 2002; Kumar et al., 2008; Salovey et al., 2000; Segerstrom et al., 2003).

#### 5.4.1.4 Increased capacity for acceptance

In the qualitative interviews, participants reported that after consistent mindfulness practice that they noticed an increased acceptance of difficult experiences. Participants reported experiencing less need to control situations as they occurred in their lives. Participants also reported that due to this relaxed need for control that they experienced less cognitive activity generally and a more accepting quality of awareness. This is in line with Grabovac et al.'s (2011) description of acceptance as a quality of awareness that can both help the development of and is the result of concentration and mindfulness after meditation. This increased acceptance and resultant decreased need for emotional and behavioural control appears to have reduced the extent to which participants felt they needed to over-engage with their experience through worry or rumination. This allowed participants to genuinely experience and express their emotions and improvements in wellbeing to accrue. This is consistent with the theories of Borkovec (1994), Hayes et al., (1996) and Nolen-Hoeksema (1998) outlined in chapter 1. These findings are also similar to the qualitative findings of both Colgan et al. (2017) and Hoffman et al. (2012) who found that increased acceptance was an important factor in the improved wellbeing experienced by oncology patients and people suffering from PTSD after engaging in mindfulness practice.

#### 5.4.1.5 Self-compassion

The relationship between the increased self-compassion experienced by the MBCT participants when they felt things went wrong and the reduced negative thoughts about oneself due to this has been reported in a number of quantitative mindfulness studies in diverse context and countries such as Leary et al. (2007), Odou and Brinker (2014) and Smeets et al. (2014). This increased self-compassion appears to have allowed negative self-critical thoughts to pass without fixation, which facilitated improved wellbeing, anxiety and mood. This is consistent with the empirical mindfulness studies of Hölzel et al. (2011) and Kuyken et al. (2010) who argue that the increased self-compassion associated with MBCT may be a key mechanism by which these interventions improve anxiety, depression and wellbeing. This finding is also supported by the numerous mindfulness studies that have found that treating oneself compassionately when confronting personal suffering promotes mental health, and the growing evidence that self-compassion could be an important predictor of well-being, anxiety and depression as highlighted by the studies of Barnard and Curry (2011), MacBeth and Gumley (2012) and Pauley and McPherson (2010).

#### 5.4.2 Reduced negative thinking

A common pattern emerged in the interview data, in that all interview participants advised that they experienced reductions in either rumination or worry. This appears to be due to the increased use of the mindful approach oriented coping skills learned as part of the MBCT intervention. This is consistent with the mechanisms set out in the CBPM based on Grabovac et al. (2011). The MBCT participants reported that the tuning down of ruminative and/or worried thought allowed clearer and less cluttered thinking to occur. This finding is supported by the

qualitative results of Bormann et al. (2013), who found that mindfulness practice lead to clearer thinking amongst 65 war veterans with PTSD. This allowed participants to experience less anxiety, improved mood and an increased sense of wellbeing. The idea that the reduced rumination reported by the participants in this study might serve as a mediator between increased mindfulness practice and improved mood is consistent with the theoretical rationale for MBCT (Segal et al., 2002). In MBCT, decreased rumination is identified as the key mechanism of change in mindfulness practice, with the cultivation of psychological wellbeing due to this being an essential feature of MBCT (Segal et al., 2002). This finding is also in line with Nolen-Hoeksema (2000), who in large scale community adult sample ( $N = 1,789$ ) found that rumination predicted changes in symptoms associated with both depression and anxiety. The finding that decreased worry would lead to the improved wellbeing and reduced anxiety reported by the participants in this study is also consistent with the theory on the nature, functions and origins of worry of Borkovec (1994). In this theory, Borkovec (1994), identified that people who engage in worry experience all of its negative consequences e.g. exaggerated problems, and may fail to adequately resolve stressors that arise, which results in increased anxiety and decreases in wellbeing.

#### 5.4.3 Mental health and wellbeing improvements

This group of MBCT participants consistently reported that by engaging in consistent mindfulness practice that they noticed improvements in their anxiety levels, mood and wellbeing. This was in spite of the fact that no questions on potential changes in these CBPM outcomes were asked of the MBCT participants. This finding is in agreement with the RCT results in chapter 4 and the qualitative results of



Kvillemo and Branstrom (2011), Morone et al. (2008) and Stankovic (2011) which found that engaging in a mindfulness intervention led to improvements in the anxiety, mood and wellbeing of oncology patients, older adults and military combat veterans. This group of participants reported that acquiring an increased repertoire of approach oriented coping skills was the major factor in their improved mental health and wellbeing. This finding is in line with theories of Holahan et al. (1996) and Holahan and Moos (1991, 1990), also outlined in chapter 1, who hypothesized that people who rely more on approach coping, rather than avoidant coping tend to adapt better to life stressors and experience fewer psychological symptoms. Participants also reported in varying degrees how being more approach oriented in general and having increased CBPM capacities led to these improvements in their anxiety, depression and/or wellbeing, either directly or through reduced rumination and/or worry. This finding supports the direct and mediated effects CBPM, based on Grabovac et al. (2011) model's conceptualization of how mindfulness practice is likely to improve the anxiety, depression and wellbeing of psoriasis patients.

#### 5.4.3.1 Psoriasis

There was no qualitative agreement found amongst the participants on whether practising mindfulness affected the symptoms of psoriasis. This is in agreement with the findings of Fordham et al. (2015). Of the 10 participants in this study, half claimed to observe an improvement in the appearance of their psoriasis, with the other half reporting no change. None of the participants believed that mindfulness would cure their psoriasis. Similar to Fordham et al. (2015) and Mackenzie et al. (2007) this study found that some participants felt that they had acquired increased cognitive and behavioural control over their reactions to their psoriasis symptoms, which may be

due to the reduced stress the condition was causing, and/or the increased acceptance of the condition experienced by some participants.

#### 5.4.4 Strengths and contribution of this study

The use of interview data enhanced the strength of this thesis in a number of ways. The use of qualitative methods in this study, complemented the SEM study findings in chapter 3 by allowing a more complete understanding of how the CBPM domain and mediating might impact anxiety, depression and wellbeing through the subjective experiences of psoriasis patients who had just completed the intervention. This study also allowed the findings from chapter 4 to be triangulated through comparison, and corroboration providing a more comprehensive exploration whether MBCT is an appropriate intervention to meet the physical and mental health needs of psoriasis patients. Using qualitative methods also allowed the deeper exploration of the individual experiences of psoriasis patients of this MBCT programme, which provided a clearer understanding as to what learning individual group participants found to have been most beneficial to their lives, and how they may have put this learning into practice since completing the MBCT intervention. The use of qualitative interviews also offered this group of MBCT participants an opportunity to explore and better articulate their interpretation of each CBPM domain and its impact on their daily life.

#### 5.4.5 Limitations

The results of this study should be interpreted with caution due to several limitations. The qualitative study methodology is limited in that it cannot speak directly to MBCT's mechanisms of change. Rather, it accesses people's perceptions

and evaluations, as formulated within the context of an interview. The data analysis for this study followed a systematic procedure to ensure a certain degree of intersubjectivity of the findings, however qualitative methodology remains a subjective approach that reflects the participants' experiences and is, therefore, prone to researcher bias. Using a theory such as the CBPM as theoretical framework for the direct content analysis of the interview data may have exacerbated this limitation. This approach has inherent limitations in that researchers can approach the data with an informed but, nonetheless, strong bias. The interviewer knew the participants prior to the interviews taking place. This is due to the fact that the interviewer attended all 8 weekly MBCT groups in the RCT in chapter 4 in order to ensure treatment fidelity. The MBCT participants' reports may therefore have been inflated by a tendency to answer in a socially desirable manner. The fact that the initial questions in the interview schedule were closed may also have increased the chances that participants' answered in a socially desirable manner, due to the more limited range of answers available. The lack of an independent interviewer in this study may also have meant that participants may have felt inhibited in criticising MBCT or the facilitators involved in the running of the groups. The participants in this study opted into the MBCT programme, completed at least 7 out of the 8 sessions and also consented to being a part of this study. Therefore, it is likely that these participants were positively biased. Thus, any support for the CBPM as an explanatory framework of changes in anxiety, depression and wellbeing, or for its domains as being potentially supportive approach oriented coping strategies in this study should only be considered as being relevant to a specific, motivated population of psoriasis patients. The interviewer in this study is also a professionally qualified social worker with experience facilitating mindfulness groups. Whilst this familiarity with mindfulness interventions helped in

contextualising participants' accounts of this MBCT intervention, it is possible that the author's view of mindfulness as beneficial, meant the author was likely to be particularly alert to positive experiences reported by participants. To mitigate these limitations as much as possible, interviews were carried out in an exploratory and non-directive manner and an audit trail and audit process took place in order to as neutral and unbiased results as possible. Given the interviewer's closeness to the data and participants, an independent researcher who was without connection to this thesis was assigned, to conduct a first-stage data analysis (i.e. verifying the coding to categories), enhancing the rigor of this study. Additionally, the author sought to manage any influence on data analysis through constant grounding in the data. However biased evidence that was supportive rather than non-supportive of MBCT as an effective intervention and the CBPM cannot be ruled out. The researcher had to interview the research participants in this study due to the pragmatic limitation of having no access to an independent interviewer. In order to ameliorate the limitations outlined above and to reduce socially desirability responding in future research, the use of an independent researcher would be essential. The interviews also took place within two weeks of the completion of the intervention, and thus can only offer a short-term perspective. This limits the scope of these findings, as they can say nothing about MBCT's long-term effectiveness with psoriasis patients. In order to overcome the limitations of this study, future research should use independent interviewers with no advanced knowledge of the underlying model of mindfulness, which is being used to explore these phenomena. In order to explore the longer-term effects of MBCT, interviews could be carried out a number of months to a year after the intervention takes place.

#### 5.4.6 Future Research

Despite the limitations outlined above future researchers should continue to employ qualitative methods, to complement quantitative methodologies, in order to elicit the informative subjective experiences of psoriasis patients who have engaged in psychological interventions which may help to improve their psoriasis, anxiety, depression and wellbeing. Furthermore, 3,6, and 12-month follow-ups are needed to assess the long-lasting effects of mindfulness training among psoriasis patients.

#### 5.5 Conclusion

This qualitative study gives promising triangulated support to the findings of chapter 4, of the promising potential of MBCT as an effective intervention to improve psoriasis symptoms, wellbeing, anxiety and mood. This study also provides promising preliminary empirical evidence supporting the mechanisms of action set out in the CBPM in how these improvements might be achieved, with the relative importance of individual approach oriented mechanisms of action being different for different people. The manualised and structured format of the MBCT programme enables the easy implementation of mindfulness programmes in clinical practice, and increasing access to such interventions is likely to improve the anxiety, mood and wellbeing levels of psoriasis patients.

**Chapter 6:** A moderated mediation analysis of the differences in CBPM change scores from an RCT on the use of MBCT with psoriasis patients.

## 6.1 Introduction

The commitment to evidence-based practice in clinical psychology requires the scientific investigation of the effects of potential mechanisms of change on anxiety, depression and wellbeing (Kazdin, 2007). The literature in chapter 2 highlights that one of the most consistently articulated gaps in the mindfulness literature is the need to identify what the most important mechanisms of mindfulness interventions, which influence changes in anxiety, depression and wellbeing are (Batink et al., 2013; Gu et al., 2015; Montgomery et al., 2016; Ohlsson, 2014; Van der Velden et al., 2015). The individual domain (attention regulation, self-compassion, acceptance, mindfulness, attachment and aversion) and mediating (worry and rumination) variables of the CBPM have received both empirical and theoretical support as being potentially important mindfulness mechanisms of action which may predict changes in anxiety, depression and wellbeing in the literature presented in chapter 2. The SEM study in chapter 3 provided further preliminary empirical evidence of potential efficacy of an integrative direct and mediated effects CBPM model as a potential explanatory framework for how improvements in each of these domain and mediating variables may predict improvements in anxiety, depression and wellbeing. This model had a good SEM fit to the data of a large cohort of psoriasis patients, across a range of fit indices. This study also found that this model was a reasonable fit to the data (with less support than the larger sample) for a subset of patients who completed two sets of measures at t1 and t2. The results for this subset of patients were also found to hold four months later. The RCT study in chapter 4 found

that MBCT significantly improved each of these CBPM domain, mediating and outcome variables. This result was further supported by the results from the qualitative study in chapter 5, which provided promising triangulated evidence that MBCT may be an effective intervention to improve these CBPM domain and mediating variables along with the anxiety, depression and psychological wellbeing of psoriasis patients. The interview themes in this study also reflected the mechanistic relationships set out in the direct and mediated effects CBPM. The literature in chapter 2 and the results from chapters 3, 4 and 5 thus indicate that the CBPM may be a useful explanatory framework in understanding how changes in anxiety, depression and wellbeing may occur. The limitations of each of these studies however means that it still remains unclear what the underlying mechanisms of mindfulness are and how these may impact the anxiety, depression and wellbeing of patient groups such as psoriasis patients (Montgomery et al., 2016; Ohlsson, 2014). In order to help fill this research gap, hypothesis testing complex integrative mindfulness models, such as the CBPM, is likely to be important (Gu et al., 2015; Kazdin, 2007; Miles et al., 2015).

The use of moderated mediation analysis, whose analytical goal is to describe and understand the conditional nature of the mechanism or mechanisms by which a variable transmits its effect on another could be used to test such complex integrative models (Hayes, 2018). Moderated mediation analyses explore questions about how (mediation, or indirect effects) and under what circumstance (moderation, or conditional effects) effects operate (Hayes, 2018). The use of moderated mediation could provide a better understanding of how mindfulness works and how increases in the CBPM domains might affect the anxiety, depression and wellbeing of psoriasis patients, and for whom and in what context that effect exists or does not (Hayes,

2018). This study will use moderated mediation in order to meet this study's aims, in an attempt to provide theoretical transparency on how each CBPM domains might transmit its effect on the CBPM outcomes. The moderate sample size attained in the RCT was also a factor in the selection of moderated mediation as an analysis, as an SEM model could not be constructed due to the limited sample size attained in chapter 5. Published moderated mediation analyses have increased incrementally in mindfulness literature. This appears to be in an attempt to fill the research gap consistently articulated in the mindfulness literature in the last 3-5 years, of the need identify what the mechanisms of mindfulness that improve health and mental health outcomes might be. In a study of 399 African American smokers, Heppner et al. (2015) used moderated mediation analysis and found that stress was a mediator of the relationship between mindfulness and alcohol use of among African American smokers. In a similar study of 364 healthy adults, Lau, Leung, Kwok Wing, and Lee (2018) found that acceptance was the moderator of the relationship between awareness and psychological distress, and that psychological distress mediated the relationship between mindfulness and sleep quality. No such published research exists, which has attempted to identify the significant direct and mediated effects the CBPM's domains and mediating variables may have on the anxiety, depression and wellbeing of psoriasis patients. Research of this nature could lead to very useful knowledge for dermatologists and psychologists to be attained (Fordham et al., 2015). This research may also facilitate the development of innovative treatments, in which active therapeutic components of MBCT could be intensified and refined, and inactive or redundant elements could be discarded, leading to more potent and efficient therapies (Baer et al., 2006; Brown, 2015; Kuyken et al., 2010).



### 6.1.1 Aims of the current study

The aim of this study is to investigate if changes in the CBPM domain and mediating variables after engaging in an MBCT intervention may have a role to play in predicting the anxiety, depression and wellbeing levels of psoriasis patients. In order to achieve this aim, the objective of this study was to investigate if improvements in each CBPM domain post MBCT intervention is either directly (e.g., if a person becomes more self-compassionate, is this increase in self-compassion likely to lead to less anxiety), or indirectly (e.g., will this improvement in self-compassion lead to reduced worry and/or rumination, which will then lead to reduced anxiety) significantly associated with changes scores in the anxiety, depression and wellbeing of patients in the MBCT intervention group.

### 6.1.2 Research hypotheses

This study will test a number of hypotheses:

- 1) greater attention regulation, acceptance, self-compassion, non-attachment, mindfulness and less aversion will be significantly associated with lower anxiety, depression and improved wellbeing when moderated by group allocation (MBCT or TAU).
- 2) greater attention regulation, acceptance, self-compassion, non-attachment, mindfulness and less aversion will be indirectly significantly associated with lower anxiety, depression and improved wellbeing moderated by group allocation and will be mediated by decreases in worry and rumination.

## 6.2 Methods

### 6.2.1 Study design

In order to meet this study's aims and identify if the research hypotheses outlined above can be accepted or rejected, a moderated mediation analysis of the change scores from t1 to t2 in the RCT in chapter 4 was conducted. This study broke down the direct and mediated effects CBPM into smaller testable component pieces through the construction of a number of moderated mediation models which: (1) tested the conditional direct effects of each CBPM domain on each CBPM outcome when moderated by group allocation (an example of such a model with a direct effect is provided in Figure 6-1 below), and (2) tested the conditional indirect effects of each CBPM domain on each outcome when mediated by each CBPM mediating variable and moderated by group allocation (an example of a model with an indirect effect is provided in Figure 6-2 below). An example of one of the tested moderated mediation models is presented in Figure 6-3.

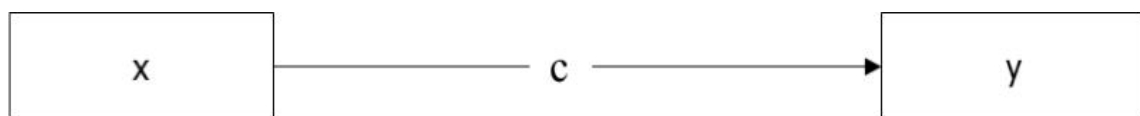
#### 6.2.2 Controlling for Type I and Type II error

The RCT in chapter 4 controlled for Type II error by having over 95 % power in detecting a small to medium effect size ( $f = .17$ ) through the recruitment of 101 participants. This sample size means that the current study is sufficiently powered to detect large moderated mediation effects at 80% power (Fritz & Mackinnon, 2007). In order to control for Type II error using bias-corrected bootstrapping, a sample size of 462 psoriasis patients would be needed for 80% power to detect small effects (Fritz & Mackinnon, 2007). Thus, this study is underpowered to control for Type II error for small to medium effects. This may result in the moderated mediation analysis not detecting pathways as being statistically significant. With this in mind, the moderated mediation analysis results from this study should be observed with caution. No  $p$ -value adjustment was made for multiple comparisons, as controlling for Type I error

in this manner is likely to further increase the chances of Type II error in this study (Rothman, 1990).

### 6.2.3 Statistical analysis

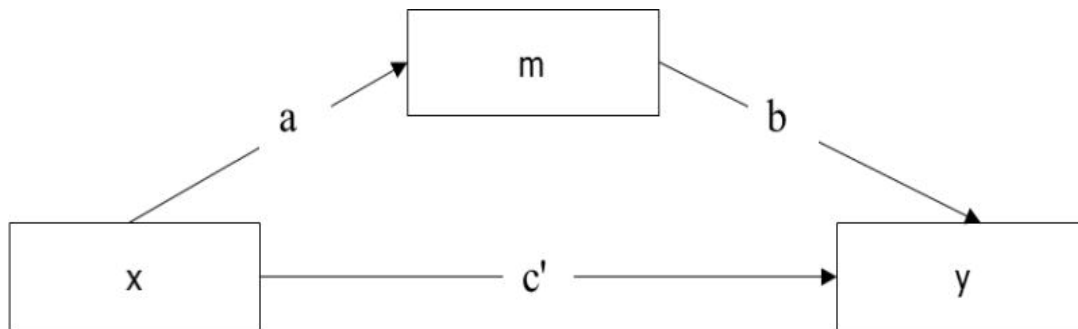
Figure 6.1 shows a model of a direct effect. This model shows the direct effect of changes in a CBPM domain (self-compassion) post MBCT intervention on a CBPM outcome variable (anxiety). In this model, the predictor CBPM domain ( $x$ ) (e.g. self-compassion) is found to be associated and presumed to be causally associated, with an outcome ( $y$ ). The size of the direct effect from  $x$ -to- $y$  is the total effect and is labelled  $c$  (Hayes, 2018).



**Figure 6-1.** Path diagram showing the conditional direct effect of changes in a CBPM domain ( $x$ ) e.g. self-compassion, on changes in the CBPM outcome ( $y$ ) e.g. anxiety.

A mediation effect occurs when a third variable explains the relationship between two other variables (Hayes, 2018). In line with the CBPM theory, a mediating variable,  $m$ , was added to each hypothesized CBPM mechanistic relationship, e.g., rumination in the context of the example shown in Figure 6-2 below. Variable  $m$  (rumination) is hypothesized to be a measure of the mechanism by which the predictor  $x$  (e.g., self-compassion) has its effect. The direct effect from  $x$  to  $y$  (e.g., anxiety) is now labelled  $c'$ . The effect from  $x$  to  $m$  is labelled  $a$ , and the effect from  $m$  to  $y$  is labelled  $b$ . The size of the effect from  $x$  to  $y$  is reduced by the total

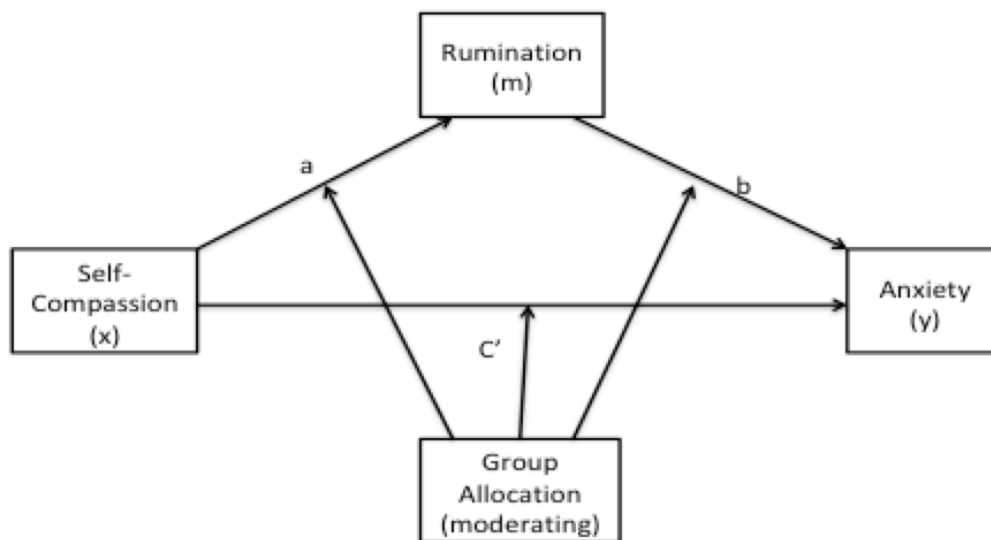
amount of the indirect effect, which is found as the product of  $a$  and  $b$ . Therefore:  $c = ab + c'$  (Hayes, 2018).



**Figure 6-2.** Path diagram showing a mediation model of indirect effect of  $x$  (self-compassion) on  $y$  (anxiety) when mediated through  $m$  (rumination).

The hypotheses in this study seek to determine whether MBCT influences the impact of the CBPM domains on anxiety, depression and wellbeing. Thus, which group the participants in the RCT were allocated to is likely to have had an influence on the size of the effect of changes in each CBPM domain on each outcome either directly, or when mediated through worry or rumination. When an investigator seeks to determine whether a certain variable (e.g., group allocation) influences or is related to the size of one variable's effect on another, a moderation analysis is the proper analytical strategy (Hayes, 2018). To fully disentangle the nature of the relationships between the CBPM variables and test this study's hypotheses, it was necessary to combine both a mediation and moderation analyses. A model that includes both a mediation and a moderation component is referred to as a conditional process model—a model in which the direct and/or indirect effect of  $x$  (e.g. self-compassion) on  $y$  (e.g. anxiety) through  $m$  (e.g. rumination) is moderated by group allocation (Hayes, 2018). When a moderated mediation analysis takes place, the direct and indirect effects outlined above are referred to as conditional direct and conditional

indirect effects (Hayes, 2018). Figure 6-3 shows a model of one of the hypothesized CBPM conditional process models, which was tested in this study. In this model the conditional direct effect of changes in self-compassion (x) post MBCT intervention on changes in anxiety (y) can be seen to be moderated by whichever group the participants were allocated to (MBCT intervention or TAU control group). This model also shows the conditional indirect effect of changes in self-compassion on changes in anxiety when mediated by rumination and moderated by group allocation.



**Figure 6-3.** Path diagram showing an example of one of the CBPM conditional process models.

Analyses were performed using SPSS 23.0 (IBM, Armonk, NY). In order to test each hypothesis, the SPSS PROCESS macro was used, due to its ability to test mediating effect, moderating effect and moderated mediating effects in a single model (Hayes, 2018). This SPSS macro PROCESS is specifically developed for assessing the complex models including both mediator and moderator variables. It has been used by a number of studies, which have explored similar hypotheses (e.g., Cero & Sifers, 2013; Chardon, Janicke, Carmody, & Dumont-Driscoll, 2016; Chen, Hsiao,

Chern, & Chen, 2014; Chung, Allen, & Dennis, 2013). Within PROCESS, Preacher and Hayes' bias-corrected nonparametric bootstrapping techniques with 5,000 bootstrap samples was used to estimate the conditional direct and indirect effects of each CBPM domain on each CBPM outcome when mediated through both worry and rumination separately and moderated by group allocation in order to test the research hypotheses (Hayes, 2018). Bootstrapping mediation tests are preferred over other mediation methods because they do not assume a normal sampling distribution of the indirect effects (Preacher & Hayes, 2008). The point estimates of the indirect effects were considered statistically significant if the 95% confidence intervals (CIs) did not contain zero. Hayes' index of moderated mediation included in the PROCESS macro for SPSS was also calculated (Hayes, 2018) to test for the presence of moderated mediation. This index tests for a nonzero weight of the moderator in the indirect effect process. In the tests for this study, a bootstrapping technique with 5,000 resamples was used providing a 95% CI; if the CI did not include zero, then moderated mediation was indicated.

## 6.3 Results

### 6.3.1. Conditional direct effects

In order to test the research hypotheses, this study examined if changes in each CBPM domain had a conditional direct effect on changes in anxiety, depression and wellbeing when moderated by group allocation. The results from these moderated mediation analyses are presented in Table 6.1 below. In order to carry out these tests using the PROCESS macro (Hayes, 2018) and also test the hypothesized conditional indirect effects of the CBPM domains on changes in these outcomes, which will be presented in section 6.3.2 below, the mediator must be specified. The coefficients in

both the conditional direct and indirect effect analyses are unstandardised. The significant moderated mediation conditional direct effects are highlighted in Table 6-1.

**Table 6-1.**

Moderated Mediation Analysis – conditional direct effect.

Variables	Index	SE	LLCI	ULCI	Index	SE	LLCI	ULCI
<i>Independent – Dependent</i>	<i>Mediating Variable: Worry</i>				<i>Mediating Variable: Rumination</i>			
Non-attachment–Wellbeing	-.17	.21	-.59	.25	-.13	.22	-.55	.3
Non-attachment–Anxiety	-.02	.04	-.09	.06	-.02	.04	-.09	.06
Non-attachment–Depression	.01	.04	-.06	.08	-.01	.04	-.06	.08
Aversion–Wellbeing	-.01	.55	-1.1	1.1	-.23	.6	-1.4	.94
Aversion–Anxiety	-.04	.09	-.23	.14	-.05	.1	-.25	.16
Aversion–Depression	-.08	.09	-.26	.10	-.08	.1	-.27	.12
Self-Compassion–Wellbeing	-.6	.4	-1.39	.19	-.45	.36	-1.16	.27
<b>Self-Compassion–Anxiety</b>	<b>.13</b>	<b>.07</b>	<b>-.003</b>	<b>.26</b>	<b>.14</b>	<b>.06</b>	<b>.02</b>	<b>.26</b>
Self-Compassion–Depression	.03	.07	-.1	.16	-.003	.06	-.12	.12
Mindfulness–Wellbeing	-.31	.26	-.83	.21	-.26	.27	-.79	.27
Mindfulness–Anxiety	-.04	.05	-.13	.05	-.04	.05	-.13	.01
Mindfulness–Depression	.04	.04	-.04	.13	.04	.04	-.05	.12
<b>Attention Reg–Wellbeing</b>	<b>1.06</b>	<b>.52</b>	<b>.03</b>	<b>.21</b>	-.87	.48	-1.8	.09
Attention Reg–Anxiety	.03	.10	-.16	.22	.07	.09	-.11	.24
Attention Reg–Depression	.07	.09	-.11	.24	.03	.08	-.14	.2
Acceptance–Wellbeing	.2	.57	-.94	1.3	.04	.57	1.1	1.18
Acceptance–Anxiety	-.06	.1	-.25	.14	.07	.10	-.26	.13
Acceptance–Depression	.06	.09	-.12	.25	.08	.09	-.10	.26

As can be seen from the conditional direct effect analysis in Table 6-1, group allocation moderated the relationship between changes in self-compassion scores and anxiety scores ( $\beta = .14, t(100) = 2.23, p = .03; 95\% CI: .02, .26$ ). Changes in self-compassion and anxiety were found to be strongly negatively correlated in the MBCT group,  $r(49) = -.4, p < .01$ , and were not found to be significantly correlated in the control group,  $r(49) = .15, p = .29$ . This indicates that increases in self-compassion scores were significantly associated with decreases in anxiety scores in the MBCT intervention group but not in the control group.

The group that the participants were allocated to also moderated the relationship between changes in attention regulation and wellbeing ( $\beta = 1.06, t(100) = 2.04, p = .04; 95\% CI: .3, 2.1$ ). Changes in attention regulation and wellbeing were strongly positively correlated in the MBCT group,  $r(49) = .68, p < .01$ . Changes in attention regulation and wellbeing were not found to be significantly correlated in the control group,  $r(49) = .04, p = .8$ . This indicates that increases in attention regulation scores were significantly associated with increases in wellbeing scores in the MBCT intervention group but not in the control group.

### 6.3.2 Conditional indirect effects

The conditional indirect effect results of the moderated mediation analyses for the MBCT intervention and TAU groups are presented in Table 6-2. The significant moderated mediation results are highlighted in this table and presented in Figures 6-4.

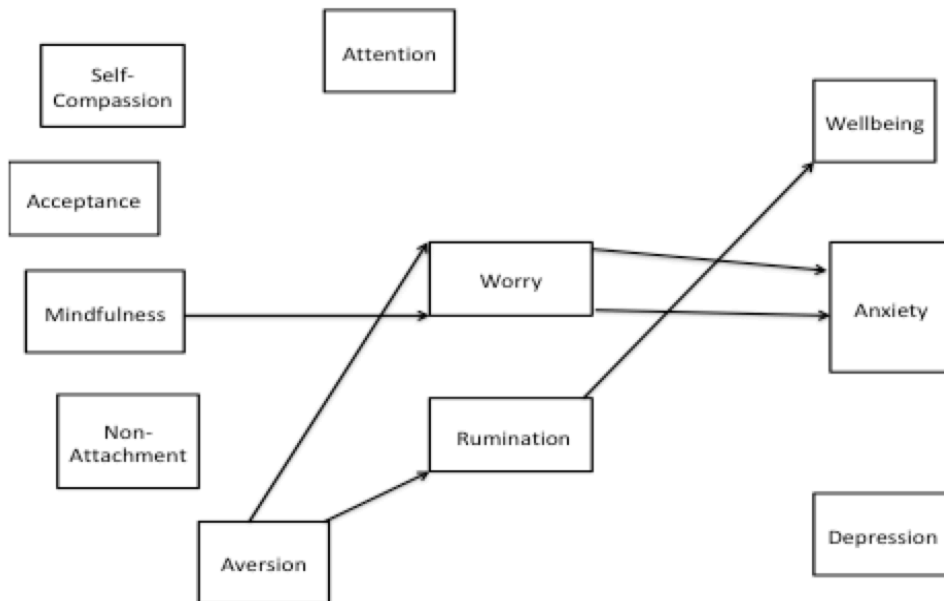
**Table 6-2.**

Moderated Mediation Analysis – conditional indirect effects.

Variables	Index	SE	LLCI	ULCI	Index	SE	LLCI	ULCI
-----------	-------	----	------	------	-------	----	------	------



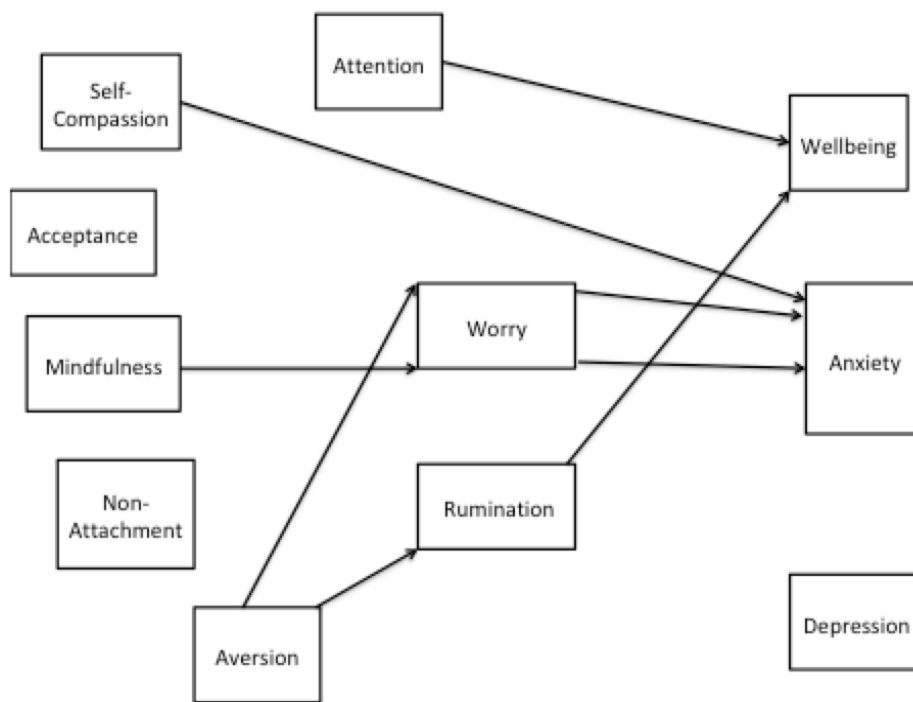
<i>Independent – Dependent</i>	<i>Mediating Variable: Worry</i>				<i>Mediating Variable: Rumination</i>			
Non-attachment – Wellbeing	-.04	.09	-.21	.15	-.09	.08	-.28	.06
Non-attachment – Anxiety	.02	.02	-.01	.06	.02	.02	-.02	.07
Non-attachment – Depression	-.01	.01	-.04	.01	-.01	.02	-.04	.03
<b>Aversion – Wellbeing</b>	.25	.17	-.06	.62	<b>.46</b>	<b>.25</b>	<b>.03</b>	<b>1.01</b>
<b>Aversion – Anxiety</b>	<b>-.06</b>	<b>.04</b>	<b>-.16</b>	<b>-.01</b>	-.06	.06	-.19	.04
Aversion – Depression	.02	.04	-.05	.09	.01	.06	-.11	.12
Self-Compassion – Wellbeing	.03	.24	-.36	.6	-.12	.14	-.4	.16
Self-Compassion – Anxiety	.01	.04	-.07	.08	.01	.03	-.06	.06
Self-Compassion – Depression	-.03	.04	-.12	.04	-.01	.02	-.05	.05
Mindfulness – Wellbeing	-.06	.09	-.26	.11	-.11	.10	-.33	.07
<b>Mindfulness – Anxiety</b>	<b>.03</b>	<b>.02</b>	<b>.01</b>	<b>.09</b>	.04	.03	-.01	.10
Mindfulness – Depression	-.01	.02	-.05	.02	-.01	.02	-.05	.03
Attention Reg – Wellbeing	.08	.31	-.47	.8	-.11	.2	-.49	.29
Attention Reg – Anxiety	.05	.06	-.07	.16	.01	.05	-.08	.09
Attention Reg – Depression	-.05	.05	-.16	.05	-.01	.04	-.09	.06
Acceptance – Wellbeing	.15	.24	-.35	.65	.31	.24	-.10	.86
Acceptance – Anxiety	-.04	.04	-.12	.03	-.03	.05	-.12	.08
Acceptance – Depression	.01	.03	-.04	.08	-.01	.03	-.08	.07



**Figure 6-4.** Significant moderated mediation conditional indirect effects found.

As can be seen from the conditional indirect effect analysis in Table 6-2, which is plotted in Figure 6-4, the conditional indirect effect of aversion on wellbeing when mediated by rumination and moderated by group allocation was positive and significantly different from zero ( $\beta = .46, SE = .25; 95\% CI: .03, 1.01$ ). This indicates that decreases in aversion scores post MBCT intervention were significantly associated with increases in wellbeing scores when mediated by reduced rumination scores for the MBCT intervention group, but not the TAU control group. The conditional indirect effect of aversion on anxiety when mediated by worry and moderated by group allocation was negative and significantly different from zero ( $\beta = -.06, SE = .04; 95\% CI: -.16, -.01$ ). This indicates that decreases in aversion scores post MBCT intervention were significantly associated with decreases in anxiety scores when mediated by decreases in worry scores for the MBCT intervention group, but not the TAU control group. The conditional indirect effect of mindfulness on anxiety when mediated by worry and moderated by group allocation was positive and

significantly different from zero ( $\beta = .03, SE = .02: 95\% CI: .01, .09$ ). This indicates that increases in mindfulness scores post MBCT intervention were significantly associated with decreases in anxiety scores when mediated by decreases in worry scores for the MBCT intervention group, but not the TAU control group. The other hypotheses outlined earlier in this chapter were not supported. The hypotheses, which were supported in this study, are presented in Figure 6-5 below.



**Figure 6-5.** Significant moderated mediation conditional direct and indirect effects found.

#### 6.4 Discussion

In the last 3-5 years, published mindfulness literature has emerged, testing different mindfulness models of action, attempting to identify what the mechanisms of mindfulness practice might be. This study tested the direct and mediated effects CBPM, which received promising preliminary support in chapter 3. This study did so in order to identify the significant direct and mediated effects that changes in the

CBPM's domain and mediating variables may have on the anxiety, depression and wellbeing of psoriasis patients. This study helps to fill a gap in the research literature outlined in chapter 2 by providing a broader picture of potential direct and mediating mindfulness variables and their relationship to each other using the same model. The discussion section of this chapter will discuss the important findings of this study in the following order: (1) the significant conditional direct effects found, (2) the significant conditional indirect effects found, (3) changes in depression not being caused by changes in any of the CBPM domains, and (4) the lack of conditional indirect and direct effects being found between acceptance, non-attachment and the anxiety, depression and wellbeing of psoriasis patients. The theoretical and clinical implications of this study along its strengths and limitations and the potential for future research studies will then be discussed.

#### 6.4.1 Conditional direct effects

This study's results provide evidence supporting a mix of conditional direct and conditional indirect effect relationships on wellbeing and anxiety. The finding that increased attention regulation had a significant conditional direct effect on wellbeing is in agreement with the amended CBPM, based on Grabovac et al. (2011). The original BPM (Grabovac et al., 2011) did not specify such a relationship and instead identified that changes in attention regulation would impact wellbeing through decreased mental proliferation. This finding provides empirical support for the addition of this direct effect pathway to the CBPM model. Consistent with the CBPM, the increased capacity of the MBCT participants to decenter from difficult thoughts and emotions, evidenced by the findings in chapter 4, may have allowed participants to pay more attention to the transitory nature of stressful situations, thoughts and

emotions. The mindfulness theories of Arch and Craske (2006) and Gross and Thompson (2007) identified that such an increased capacity to decenter from such stimuli allows more cognitive control over the processing of such experiences. In agreement with these theories and the theory papers of Arch and Landy (2015) and Brown et al. (2007), the increased capacity to decenter and the enhanced control that this may have offered the MBCT participants may have helped them to modulate their responses to stress by decentering from stress appraisals into a metacognitive mode. In line with the theory of Lazarus and Folkman (1984) outlined in chapter 2, this may have allowed more positive appraisals of the MBCT participants' environment and of difficult situations, thoughts and emotions as they occurred. The shifting of attention in this manner may thus have accounted for the direct accrual of improved wellbeing.

The finding that improvements in self-compassion scores post intervention were directly associated with reductions in anxiety is also consistent with the CBPM's amended theoretical framework. Anxiety can be exacerbated when one over-identifies with setbacks or failures (Leary et al., 2007; Neff et al. 2007). Leary et al. (2007) and Van Dam et al. (2011) hypothesized that self-compassion helps to moderate reactions to real and potential setbacks or failures, e.g., stigmatization, by engendering positive self-feelings when life goes or is perceived to be going badly. The increased self-compassion experienced by the MBCT participants after the intervention in chapter 4, may thus have attenuated the anxiety of these participants through reduced identification with the setbacks or difficulties in the patients' lives. This may have allowed more positive emotions to be generated rather than anxious feelings. The finding that changes in self-compassion were significantly associated with changes in anxiety directly supports a number of studies that have found that increased self-

compassion is associated with decreased anxiety (Costa & Pinto-Gouveia, 2011; Neff et al., 2007; Neff & Dahm, 2015; Raes, 2010; Van Dam et al., 2011).

#### 6.4.2 Conditional indirect effects

The finding that reductions in aversion scores post intervention indirectly predicted improvements in wellbeing when mediated by rumination is consistent with the BPM's original theoretical framework (Grabovac et al., 2011). The finding that reductions in levels of aversion also has an indirect effect of reducing anxiety when mediated through reduced worry is also consistent with the BPM (Grabovac et al., 2011). The mediating role that worry appears to play in the significant relationships between aversion and anxiety is also consistent with CBT models of anxiety (Hofman, 2012). It appears that after engaging in an MBCT intervention that participants have attained a more open, less averse stance. In accord with the mindfulness theory paper of Arch and Landy (2015), this may have allowed participants an increased capacity to willingly expose themselves to more unpleasant stimuli, events and experiences. This reduced aversion to difficult stimuli may have led to less need for emotional control and rigid negative avoidant thinking in the forms of worry and rumination (Borkovec, 1994; Nolan-Hoeksema, 1998). This process may have facilitated more benign cognitive appraisals of situations that may have been perceived as difficult previously to manifest, in line with the theory of Lazarus and Folkman (1984). This process may also have reduced the subjective stress experienced by the MBCT participants and improved wellbeing and anxiety symptoms as a result. Thus the overarching process in how decreased aversion may facilitate reductions in worry and rumination and how these would lead to improvements anxiety and wellbeing respectively may be quite similar, and in line with the original BPM (Grabovac et al.,

2011).

The lack of a finding that mindfulness has a conditional direct effect on anxiety, depression and wellbeing does not support the CBPM, or O'Doherty et al. (2015). O'Doherty et al. (2015) used a controlled trial design with three time-points (pre-post- follow up) to evaluate the effectiveness of MBCT on people with coronary heart disease. O'Doherty et al. (2015) revealed that the MBCT group when compared to the waiting list group showed improvements for anxiety, depression and mindfulness, with these improvements in anxiety and depression being correlated significantly with the increases in mindfulness. Similarly, Vøllestad et al. (2011) examined mindfulness as a mediator of the relationship between MBSR and improvements in anxiety, depression in randomised controlled trial for people with anxiety disorders. The results from Vøllestad et al. (2011) disagreed with the current study as it found that significant increases in mindfulness was significantly associated with decreased anxiety. Vøllestad et al. (2011) was in agreement with the present study in finding that increased mindfulness was not significantly associated with depression. The lack of a conditional direct or indirect relationship between mindfulness and wellbeing is consistent with Goyal et al. (2014)'s systematic review, which found low evidence of improved stress/distress and mental health-related quality of life. None of their conclusions yielded a high strength- of-evidence grade for a positive or null effect. The finding that improvements in mindfulness scores post intervention indirectly predicted reductions in anxiety when mediated by reductions in worry is consistent with the CBPM. Borkovec (1994) hypothesised that worry's main function was to help a person to avoid difficult stimuli which may have felt too taxing to deal with or manage. The increased mindfulness experienced by the participants in

the MBCT group, which was perceived as an approach coping strategy by the participants in the chapter 5, may thus have reduced the need for worry as an avoidant coping strategy. The MBCT participants may have felt better able to approach difficult stimuli e.g. managing their psoriasis, which may have led to more positive appraisals of these situations and more adaptive processing of the resultant difficult thoughts and emotions from these stimuli. This would be consistent with the theories of Lazarus and Folkman (1984) and Moos (2002; 1984) outlined in chapter 1. The MBCT participants may thus have experienced reduced worry and as a result less anxiety through the increased use of mindfulness as an approach coping strategy. The impact of turning down of the intensity of negative worried appraisals and using more mindful approach oriented appraisals leading to decreased anxiety, is also in accord with the theories of Hayes and Feldman (2004) and Kabat-Zinn (1990).

#### 6.4.3 Non-significant effects

None of the change scores in the CBPM domain were found to significantly associated with changes in depression in this study for the MBCT group, or predict changes in depression either directly or indirectly through rumination or worry. This indicates that the CBPM may not be a good explanatory model of changes in depression due to mindfulness practice. The finding of the CBPM domain having no conditional direct and indirect effect on depression is at odds with the literature set out in chapter 2. Gu et al. (2015) in a systematic review of 9 studies, explored the potential predictor relationship between mindfulness and depression, and found moderate, consistent evidence that increased mindfulness is a predictor of decreased depression. One of the most consistent findings in a number empirical studies are that increased self-compassion is significantly associated with reduced depression



(Barnard & Curry, 2011; MacBeth & Gumley, 2012; Neff & Dahm, 2015; Pauley & McPherson, 2010; Van Dam et al., 2011). The difference between the mindfulness literature and this study may be due to the fact that this study was underpowered to detect small to medium significant pathways, and it could be that the CBPM domains may have had small to medium significant associations with depression but this study failed to detect them. Another factor may be that the associated effect of MBCT on this sample's depression scores appears to be due to large changes in 10 (approximately 20%) of the participants in the RCT, rather than the whole sample. These 10 participants moved from abnormal and borderline abnormal ranges on the HADS-D to the normal range post intervention. The remaining sample showed little variation in depression scores post intervention, which may be due to the low levels of depression experienced at baseline. It may be that the low numbers of participants who changed in depression scores coupled with the limited power in this study to detect significant pathways that might explain why changes in CBPM domains were not found to be significantly associated with changes in depression. The use of the HADS-D to measure depression in this study may also help explain the differences between the present study and Gu et al. (2015) and the literature on self-compassion and depression exemplified by Van Dam et al. (2011). The 9 studies reviewed by Gu et al. (2015) used either the 17-item Hamilton Depression Rating Scale (HDRS, Hamilton, 1960), the 20-item Center for Epidemiological Studies Depression Inventory (CES-D; Radloff 1977) or the 21-item Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). Van Dam et al. (2011) also used the BDI-II to measure depression. The HADS-D has a restricted range (7-items) when compared to the HDRS, the CES-D and the BDI-II, which could have led to reduced correlations between the CBPM domains and depression in the present study (Furr, 2017). The

difference could also be due to the HDRS, the CES-D and the BDI-II potentially being more sensitive measures of depression (Cameron et al., 2011). Future studies, which attempt to measure the relationships between the CBPM domains and depression, may therefore benefit from measuring depression with the HDRS, the CES-D or the BDI-II rather than the HADS-D. It is also important that future studies that investigate the CBPM mechanisms of action on the depression symptoms of psoriasis patients use larger sample sizes of patients, ideally with more chronic depressive symptoms, e.g., psoriasis patients with acute depression symptoms, at baseline in order to examine these effects without such floor effect limitations.

The increased non-attachment and acceptance scores experienced by the MBCT participants in chapter 4 were not found to be significantly associated with changes in their anxiety, depression and wellbeing scores, either directly or indirectly through reduced rumination and worry. These findings appear to refute the hypothesis set out in the CBPM, based on by Grabovac et al. (2011). These findings do not concur with traditional Buddhist writings (e.g., Abhidhamma Pitaka as summarized by; Mendis 2006; Narada Maha Thera, 1987), which hypothesised that wellbeing will be directly improved by reducing tendencies towards attachment to internal and external phenomena as highlighted by Kumar (2003) and Wallace and Shapiro (2006). These findings are also not consistent with the theory paper of Kumar et al. (2008) who hypothesised that reduced over-engagement/attachment to thoughts and emotions is likely to be associated with decreased anxiety and increased wellbeing. There is very limited empirical evidence to support these traditional Buddhist claims, which are mainly based on anecdotal evidence. This thesis is the first to test these variables, and their relationships with wellbeing in the context of western psychological empirical

science. On the basis of the present study, no evidence for large significant associations between these variables was found. The finding of increased acceptance not being a direct predictor of wellbeing is also inconsistent with the results of an RCT carried out by Fledderus et al. (2010). Fledderus et al. (2010) assessed an intervention based on acceptance and commitment therapy and MBSR and found that enhancement of acceptance (measured by the AAQ-II) during the intervention mediated the effects of the intervention on the psychological wellbeing of adults with mild to moderate psychological distress. The differences between this study's findings and the empirical and theoretical literature on the potential importance of changes in acceptance and non-attachment on the CBPM outcomes may be due to the limited power in this study to detect small to medium significant pathways.

#### 6.4.4 Clinical and theoretical implications

This study provides some evidence for the utility of the CBPM, which assimilates aspects of the original eastern components of mindfulness, as a potentially useful explanatory model of changes in anxiety and wellbeing due to MBCT group participation, but not depression. The results in chapter 4 highlighted how engaging in an MBCT intervention appears to improve each CBPM variable at a group level. This study identifies how changes in 4 of these 6 CBPM domains (self-compassion, attention regulation, aversion and mindfulness) were significantly associated with changes in the anxiety and wellbeing of the MBCT group participants, through reduced worry, rumination or both, or directly without such a mediated relationship. The greater understanding of how changes in anxiety and wellbeing might occur, which this study offers, may allow MBCT to be refined for psoriasis patients, potentially increasing its potency in improving the anxiety and wellbeing of this

patient population (Kraemer, Wilson, Fairburn, & Agras, 2002). A new intervention based on improving the CBPM domains of self-compassion, attention regulation, aversion and mindfulness could also to be developed to support the anxiety and wellbeing of psoriasis patients (Kraemer et al., 2002).

#### 6.4.5 Study strengths and limitations

This study has a number of strengths and limitations. The external validity of this study is strengthened by some of the same factors that strengthened the RCT's external validity: 1) the random assignment procedure used, (2) the gender stratification as part of the randomization procedure, and (3) the wide but similar age range of the participants between groups. The internal validity of the moderated mediation study was enhanced by the suitability of the design and analytical techniques used to hypothesis test the relationships between the CBPM domains and outcome variables, and the fidelity with which these designs and techniques were implemented (Tashakkori & Teddlie, 2008; Teddlie & Tashakkori, 2003).

The inherent limitations of using moderated mediation analysis of two data points within a repeated measures design means that this study cannot establish and assert claims of causality between the hypothesized CBPM predictor variables, anxiety and wellbeing (Hayes, 2018; Kazdin, 2007; Mathieu & Taylor, 2006). The pattern of the significant relationships found among the variables is consistent with theoretical reasoning set out in the CBPM, but the data do not definitively prove that the relationships exist as they are presented in the model. In addition, this study is underpowered to control for Type II error. Thus, this study's results should be observed with caution and considered preliminary. The external validity of these

findings are also limited by self-selection bias due to the fact that participants were not selected at random from all members of the psoriasis population in Ireland. Instead, participants were randomly assigned from a sample of people who wanted to take part in the study and who remained in the study, therefore making it difficult to establish how representative this population is of the wider psoriasis population.

#### 6.4.6 Future research

This study provides preliminary evidence for some of the mechanisms of action set out in the CBPM. It is important that future studies, which investigate the effect of the CBPM domains on the anxiety, depression and wellbeing of psoriasis patients using moderated mediation analysis, use larger sample sizes in order to examine these effects with sufficient power to detect all significant pathways present.

#### 6.5 Conclusion

In conclusion, this study aimed to identify if, after engaging in an MBCT intervention, changes in attention regulation, self-compassion, acceptance, mindfulness, non-attachment and aversion predict changes in wellbeing, anxiety and depression scores either directly, and/or indirectly when mediated through worry and rumination, and moderated by group allocation (MBCT or TAU group) in line with the CBPM's theoretical framework. This study provides evidence that 4 of the 6 CBPM variables having either a conditional direct or indirect effect relationships (mediated through worry or rumination) on psoriasis patient anxiety and wellbeing. Overall, this study has provided some initial evidence on what the significant mechanism of mindfulness might be, helping to fill the gap in the research outlined in chapter 2.

## **Chapter 7: General Discussion**

### 7.1. Summary of PhD chapters

The literature on psoriasis highlights that having this chronic incurable condition can result in patients experiencing a heavy psychosocial burden, which can result in higher levels of anxiety, depression, and poorer wellbeing for patients. Despite the high rates of distress, and potential associations between psoriasis and distress, patients with psoriasis have historically been somewhat invisible in empirical psychological research and practice. The literature outlined in chapters 1 and 2 of this thesis identified a clear need in the health, psychology and psoriasis literatures for research that explores and better understands how patients might be supported in coping with the burden of this condition; in addition, research needs to examine if and how potential treatment options, such as mindfulness interventions, achieve their effectiveness in improving the anxiety, depression and wellbeing levels of psoriasis patients. In order to fill these research gaps, this thesis had a number of aims: (1) to provide a greater understanding of the individual differences in the wellbeing, anxiety and depression of psoriasis patients, and the relationships between the CBPM domain, mediating and outcome variables, (2) to investigate the effectiveness of MBCT on psoriasis symptoms, anxiety, depression and wellbeing, (3) examine if MBCT was effective in improving the six CBPM domains (mindfulness, attention regulation, acceptance, self-compassion, non-attachment and aversion) and two mediating variables (worry and rumination) of the CBPM theory, (4) to explore the experience of psoriasis patients who have completed an MBCT intervention, and (5) investigate if changes in the CBPM domain and mediating variables after engaging in an MBCT intervention may have a role to play in predicting the anxiety, depression and wellbeing levels of psoriasis patients. This research was carried out in order to

provide evidence that might support psychologists' and dermatologists' capacities to support the mental health and wellbeing of psoriasis patients through improved support-planning options. This research may also facilitate the development of innovative treatments, in which active therapeutic components of MBCT could be intensified and refined, and inactive or redundant elements could be discarded, leading to more effective and efficient therapies (Baer et al., 2006; Brown, 2015; Kuyken et al., 2010).

The rest of this chapter will provide a brief overview of each empirical chapter and then discuss the evidence from this thesis in relation to: (1) the efficacy of MBCT at improving each CBPM domain, mediating and outcome variable, (2) the utility of using the CBPM as an explanatory theory in how changes in the wellbeing, anxiety and depression in psoriasis patients may occur, (3) refined CBPM's for anxiety and wellbeing, (4) future research needed after this thesis, (5) the implications of this thesis for clinical practice, and (6) the implications of this thesis for theory on supporting psoriasis patient anxiety and wellbeing.

The SEM study in chapter 3 provided promising preliminary evidence for a direct and mediated effect CBPM as being a potentially useful explanatory framework of variation in psoriasis patient anxiety, depression and wellbeing. This study's results also suggest that non-attachment, aversion, acceptance and self-compassion could potentially have a direct effect on the wellbeing, anxiety and depression of psoriasis patients, and an indirect effect through reduced worry and rumination. This study provides preliminary evidence that should psoriasis patients engage in psychological interventions, which have the capacity to improve one or more of the CBPM domain

and mediating variables, that they may accrue improvements in their anxiety, depression and wellbeing.

Chapter 4 contained an RCT, which indicated that MBCT could be a feasible adjunct intervention to improve psoriasis severity, anxiety, depression and wellbeing. The results from this study also highlighted that MBCT also improves the domain and mediating variables set out in the CBPM. This study's results mean that if replicated using independent samples in different contexts, then MBCT could be added to the set of clinical interventions that mental health professionals use to support the physical and mental health of psoriasis patients, particularly those who suffer from anxiety and depression issues and poor wellbeing.

Chapter 5 was a qualitative study using semi-structured interviews to explore the impact of MBCT on 10 psoriasis patients who completed at least 7 out of 8 weeks of the intervention. This study found that MBCT might be an effective intervention to improve the CBPM domain and mediating variables along with the anxiety, depression and wellbeing of psoriasis patients. The interview themes in this study also reflected the mechanistic relationships set out in the CBPM regarding how changes in anxiety, mood and wellbeing were experienced.

The moderated mediation study in chapter 6 found that changes in 4 (mindfulness, aversion, attention regulation and self-compassion) of the 6 CBPM variables scores post MBCT intervention had either a significant conditional direct or indirect effect (mediated through worry or rumination) on patient anxiety and wellbeing. No significant moderated mediation relationships were found between



changes in the scores on the CBPM domains and depression. These results are in line with chapters 3, 4 and 5, which provide preliminary evidence supporting the promising potential of mindfulness interventions to potentially reduce anxiety and support wellbeing in psoriasis patients through increasing levels of mindfulness, self-compassion, attention regulation and decreasing aversion, worry and rumination.

#### 7.1.1 Efficacy of MBCT on psoriasis, anxiety, depression and wellbeing

This thesis contained the first fully powered RCT to detect small to medium effects of the impact of MBCT on self-reported psoriasis, distress and wellbeing outcomes with psoriasis patients. Prior to this study, only three RCTs examined the effectiveness of MBCT on psoriasis symptoms, with two examining the effectiveness of MBCT on psoriasis patient anxiety and depression, and one examining its effectiveness on psychological wellbeing. Fordham et al. (2015) used the HADS-A and HADS-D as a single score to measure psychological distress, with D'Alton et al. (2018) retaining the HADS-A and HADS-D to measure anxiety and depression separately. D'Alton et al. (2018) also used the same PWBS that was used in this thesis to measure psychological wellbeing. The RCT in this thesis differed from these two studies, both of which found that MBCT did not have a significant effect on these outcomes. The differences in results between this thesis and these two studies appears to be due to floor effects and limited power to detect small effect sizes being present in both D'Alton et al. (2018) and Fordham et al. (2015). The RCT in this thesis did not suffer from these limitations due to the larger number of participants and the higher severity of anxiety, depression and lower levels of wellbeing being experienced by the trial participants at baseline. MBCT was found to improve self-reported psoriasis in the immediate term in the RCT in this thesis. This is consistent with the

findings of Fordham et al. (2015) and Kabat-Zinn (1998) but differs from D'Alton et al. (2018). The difference with D'Alton et al. (2018) may again be due to the floor effects identified as being present by the authors in this study, due to the low psoriasis severity experienced by the participants at baseline in their study. The qualitative interviews in chapter 5 complemented the RCT's findings on the MBCT effectiveness at improving the anxiety, depression and psychological wellbeing of psoriasis patients. The results were more mixed for changes in self-reported psoriasis post MBCT intervention, with half of the interviewees feeling that their psoriasis had improved due to being a part of the intervention and the other half reporting that they felt their psoriasis had not changed due to the intervention. This finding is consistent with a similar qualitative study on the acceptability and usefulness of MBCT carried out by Fordham et al. (2015). The results from this thesis overall indicate that MBCT is an effective intervention in improving the psoriasis patient anxiety and wellbeing in the immediate term, and may also be effective for improving depression in the short term. The small to medium significant effect sizes found on the anxiety, depression and wellbeing of the psoriasis patients in this study are consistent with the findings of a number of RCTs, systematic reviews and meta-analyses on the impact of mindfulness interventions (either MBCT or MBSR) on these outcomes with other clinical and non-clinical populations. This literature has typically found that MBCT has a small to medium effect on wellbeing (Bolier et al., 2013; Pots et al., 2014), anxiety (Bohlmeijer et al., 2010; Goyal et al., 2014; Hofman et al., 2010; Pots et al., 2014) and depression (Bohlmeijer et al., 2010; Bolier et al., 2013; Goyal et al., 2014; Hofman et al., 2010; Pots et al., 2014).

The improvement in self-reported psoriasis, anxiety and depression in the MBCT group appears to be driven by large improvements in some of the participants. From t1 to t2 in the RCT, 14 of the 51 participants recorded that their self-reported psoriasis improved by over 10 points on the SAPASI scale (with 5 of these participants recording changes of over 15 points). This is compared to 20 patients who scored less than a 5-point improvement, no improvement or a disimprovement in self-reported psoriasis. On the HADS-D, 8 participants reported an improvement of 4 points or more at t2, with 20 reporting improvements of less than 4 points. This is compared to the remaining 23 participants who either showed no change in depression scores or a small increase (none by more than 2 points). A similar pattern emerged with the HADS-A, where 13 participants reported an improvement of 4 points or more at t2, with 20 reporting improvements of less than 4 points. This is compared to the remaining 19 participants who either showed no change in anxiety scores or a small increase (none by more than 2 points). No one intervention is likely to be clinically adequate for all patients and situations (Norcross & Beutler, 2008). These results would seem to bear this out, and indicate that MBCT may be particularly effective for some psoriasis patients but not for all. Therapeutic interventions such as MBCT should thus be flexibly tailored in a personalized approach to the unique needs, preferences and contexts of the individual patient, not universally applied in a blanket one size fits all approach (Norcross & Beutler, 2008). This would likely lead increased treatment adherence and improved patient outcomes because when patients play a more collaborative role in managing their health and care, they are more likely to stick to their treatment plans and remain adherent (NICE, 2009). Increased patient involvement is also an important part of quality improvement since it has been associated with improved physical and mental health outcomes (Say & Thompson,

2003). Care that is person-centred in this way would also represent better value for money because it ensures that services are built on the needs and preferences of the people who use them, rather than on the convenience of providers (NICE, 2009). In order to ensure that this personalized approach is actualized, increased person-centred screening and assessment of psoriasis patients and the matching of MBCT to those who would likely benefit most from it would be integral. An example of this would be screening patients who believe they have stress responsive psoriasis and referring them to an MBCT group. For this patient subgroup, MBCT might be successful at improving their self-reported psoriasis by reducing stress and thus reducing the release of cortisol which has been linked to the worsening of psoriasis symptoms through HPA activation (Connor, Liu, & Fiedorowicz, 2015; Richards et al., 2005). As outlined earlier in the chapter 6, increases in self-compassion scores through participation in an MBCT group were found to be associated with reduced anxiety. In the process of a person-centred assessment, should a psychologist in collaboration with a psoriasis patient assess that their self-critical thinking may be contributing to their anxiety symptoms, the psychologist could ascertain the patient's interest in engaging in an MBCT intervention e.g. the patient may have an interest in mindfulness, or may prefer a group to an individual intervention such as CBT. Such an approach would likely match an appropriate participant to MBCT, while also likely increasing MBCT's treatment effects through increased participant compliance with the intervention (Norcross & Beutler, 2008; Say & Thompson, 2003).

#### 7.1.2 Efficacy of MBCT on CBPM domain and mediating variables

The evidence from this thesis provides support for MBCT's effectiveness in improving the CBPM's domain (mindfulness, attention regulation, acceptance, self-

compassion, non-attachment and aversion) and mediating variables (worry and rumination). The RCT in chapter 4 found small to large significant effect sizes across these variables versus the TAU control group post intervention. These changes held three months post intervention for all domains except acceptance and aversion. The qualitative interviews from the mixed methods study complemented the RCT's findings. Thus, the results of this thesis support the hypothesis offered by the CBPM theory that engagement in mindfulness practice will lead to improvements in the CBPM domain and mediating variables. These results are consistent with the findings of a number of small scale RCTs outlined in chapter 2 with samples of patients with depression. These studies found that MBCT has medium to large effect on the mindfulness (Kuyken et al., 2008; Labelle et al., 2010; van Aalderen et al., 2012); a medium sized effect on self-compassion (Kuyken et al., 2008); medium to large effects on attention regulation (Bieling et al., 2012; Hargus et al., 2010); small to medium effects on acceptance (Bedard et al., 2014); a medium to large effect on rumination (Labelle et al., 2010; van Aalderen et al., 2012) and medium effects on the worry levels of these participants (Batink et al., 2013; van Aalderen et al., 2012).

## 7.2 CBPM as an integrative theory

The promising preliminary triangulated empirical evidence from this thesis is broadly supportive of the relationships set out in the CBPM theory and the hypothesis that the CBPM domains are significantly associated with psoriasis patients' anxiety and wellbeing. These assertions are supported by the results in the SEM study; to the best of the author's knowledge, the first of its nature carried out with a psoriasis patient sample. The qualitative experience of MBCT participants in the mixed methods study further supported the potential utility of the CBPM as an explanatory

theory of how changes in in the anxiety and wellbeing of psoriasis patients may accrue. The results of chapters 3, 5 and 6 provide evidence for each of the 6 CBPM domains having a significant association with anxiety and/or wellbeing either directly (e.g., attention regulation was found to be a significant predictor of wellbeing in chapter 3 and 6) or through mediated relationships with worry and/or rumination (e.g., aversion was significantly associated with anxiety when mediated by worry and rumination in chapters 3, and when mediated through worry in chapter 6). The findings on each CBPM domain and its direct and mediated relationships with anxiety and wellbeing will now be discussed. The results of chapters 3, 5 and 6 provided scant evidence of significant associations between the CBPM domains and depression. This will be discussed subsequent to this in section 7.2.7 below.

### 7.2.1 Aversion

Of the six CBPM domains, aversion appears to have the strongest evidence for being a potential predictor of both anxiety and wellbeing, both directly and indirectly through reduced worry and rumination. In chapter 3, aversion was found to significantly associated with anxiety and wellbeing and indirectly (mediated through worry and rumination) with anxiety. The moderated mediation study found that changes in aversion scores post MBCT intervention were significantly indirectly associated with changes in wellbeing through rumination, and anxiety through worry. These findings were further supported by the findings in chapter 5, where changes in aversion post MBCT intervention were highlighted by interview participants as having both a direct and indirect effect on their anxiety and wellbeing. The mediated relationships between aversion and wellbeing and anxiety are consistent with the BPM's original theoretical framework (Grabovac et al., 2011), which suggests that

reduced aversion to thoughts, feelings, and emotions leads to less need for emotional control and rigid negative thinking (e.g., in the form of rumination or worry), which leads to improvements in wellbeing and reduced symptoms (e.g., anxiety in the CBPM). The direct significant pathways between reduced aversion and improved anxiety and wellbeing is supported by the CBPM, and traditional Buddhist writings (e.g., Abhidhamma Pitaka as summarized by; Mendis, 2006; Narada Maha Thera, 1987), where wellbeing is thought to be directly improved by reducing tendencies towards aversion to internal and external phenomena, as highlighted by works of Kumar (2003) and Wallace and Shapiro (2006). These findings are also supported by substantial psychological empirical evidence (e.g., Salovey et al., 2000; Segerstrom et al., 2003; Gross, 2002) and the stress coping theory of Moos (2002; 1984), which outline that the avoidance of thoughts and emotions are associated with worse psychological outcomes including increases in anxiety and reductions in wellbeing.

### 7.2.2 Self-compassion

This thesis provides promising preliminary evidence that suggests that increased self-compassion could directly improve wellbeing, and improve anxiety both directly and through a mediated effect of changes in worry and rumination. The SEM study in this thesis found that self-compassion was significantly associated with wellbeing directly, and significantly associated with anxiety through a mediated relationship with rumination and worry. These results were supported by the qualitative interviews in chapter 5, where all ten interviewees identified increased self-compassion after completing the MBCT intervention. These participants then identified the direct and mediated effects that this increase in self-compassion had on their anxiety and wellbeing. In the moderated mediation study, changes in self-

compassion scores post intervention were also found to have a conditional direct effect on changes in anxiety. These findings support the CBPM and are consistent with numerous empirical mindfulness studies, carried out in diverse contexts and countries, which have found that increased self-compassion associated with MBIs may be a key mechanism by which these interventions improve anxiety and wellbeing (Barnard & Curry, 2011; Hölzel et al., 2011; Kuyken et al., 2010; Leary et al., 2007), MacBeth & Gumley, 2012; Odou & Brinker, 2014; Pauley & McPherson, 2010; Smeets et al., 2014). The finding of a mediated relationship between self-compassion and anxiety is in line with the works of Baer et al. (2012), Krieger et al. (2013), Neff (2003a), Neff and Dahm (2015), Neff and Vonk (2009). These studies collectively argue that increased feelings of caring and kindness towards oneself in the face of difficult life events may foster a more approach-oriented way of functioning, in a manner similar to the stress coping theory of Moos (2002; 1984) outlined in chapter 1. Increased self-compassion in this way, they argue, reduces the need for the use of avoidant coping strategies, e.g., through rumination (Nolan-Hoeksema, 2000) and worry (Borkovec, 1994), and improved use of more adaptive coping strategies that lead to better mental health and wellbeing.

### 7.2.3 Mindfulness

The CBPM domain, mindfulness, appears to have triangulated evidence, which suggests that it might be a key predictor of anxiety through direct and mediated changes in mental proliferation, in particular through worry. This is highlighted by the results from chapter 6, which found that changes in mindfulness scores post MBCT intervention indirectly predicted changes in anxiety when mediated by changes in worry. These results were further supported by a number of interviewees in chapter 5.



All 10 interviewees identified feeling more mindful after completing the intervention, with 7 participants identifying that they felt less anxious as a result of this. These results were reported despite no questions on anxiety being asked. These participants noticed a direct impact of being more mindful on their anxiety, and also identified that by being more mindful they found they worried and ruminated less and that they were less anxious generally. These results are in line with the CBPM and the theories of Borkovec (1994), Hayes and Feldman (2004), Kabat-Zinn (1990) and Moos (2002; 1984) who identified that increased mindfulness may be a powerful prophylactic for the recurrence of anxiety through an increased ability to approach difficult thoughts and/or emotions instead of avoiding them through worry and/or rumination. This result is also consistent with O'Doherty et al. (2015) who used a controlled trial with three time-points (pre-post- follow up) to evaluate the effectiveness of MBCT on people with coronary heart disease. The results revealed that the MBCT group when compared to the waiting list group showed improvements for anxiety and mindfulness, with these improvements being correlated significantly with the increases in mindfulness. This result is also consistent with Vøllestad et al. (2011) who looked at mindfulness as a mediator of the relationship between MBSR and improvements in anxiety and worry in a randomised controlled trial for people with anxiety disorders. The results indicated that during MBSR significant increases in mindfulness skills mediated the relationship between MBSR and anxiety and worry.

In both chapter 3 and 6, mindfulness was not found to be significantly associated with wellbeing or depression. Thus, the evidence from this thesis does not support the CBPM's conceptualization of mindfulness as a key predictor of wellbeing, either directly or through a mediated relationship. The lack of a significant

relationship between mindfulness and wellbeing is consistent with Goyal et al. (2014)'s systematic review, which found low evidence of improved stress/distress and mental health-related quality of life. None of their conclusions yielded a high strength- of-evidence grade for a positive or null effect. The finding that changes in mindfulness were not significantly associated with changes wellbeing is not in line with Baer et al. (2012) who found that mindfulness, measured using the Five Facet Mindfulness Questionnaire (Baer et al., 2006), was a significant predictor of wellbeing, measured by Ryff's Psychological Wellbeing scales (Ryff & Keyes, 1995) in long-term meditators. The differences between the results in this thesis and Baer et al. (2012) may be due to the different measurements of mindfulness used and the fact that Baer et al. (2012) analysed the cross sectional results from experienced meditators who meditated regularly ( $N = 77$ ) and non-meditators ( $N = 75$ ), and their results showed that the significant association between duration of regular meditation practice and psychological wellbeing with approximately 50% of this association accounted for by mindfulness scores. Thus, it may mean that for mindfulness to predict wellbeing and depression, that participants from mindfulness interventions may have to become experienced in meditation, and also practice regularly before mindfulness is likely to impact their wellbeing and depression. This is supported by some of the interviews from chapter 5, where MBCT group participants, who had received the highest dose of mindfulness training (through the attendance at least 7 out of the 8 sessions) identified that through increased mindfulness practice that they noticed improvements in their wellbeing and mood. Further research on the capacity of mindfulness to predict changes in the wellbeing and depression of psoriasis patients is required however, in order to clarify if mindfulness is an important variable to

understand the mechanisms through which mindfulness practice may lead to improved wellbeing and depression for psoriasis patients.

#### 7.2.4 Attention Regulation

The literature on the impact of attention regulation on anxiety, depression and wellbeing is limited, and the literature that does exist is mainly theoretical in nature. This PhD provides evidence that variation in attention regulation may be a key direct predictor of wellbeing in line with the CBPM. This is evidenced by the findings in the moderated mediation study, where changes in attention regulation scores post MBCT intervention were found to directly predict changes in wellbeing scores. This finding was further corroborated by the findings in chapter 5, where improvements in the interviewees' capacity to regulate their attention post MBCT intervention was highlighted by interview participants as having a direct effect on their wellbeing. Consistent with the CBPM and the mindfulness theories of Arch and Craske (2006) and Gross and Thompson (2007), the increased capacity to decenter attained through mindfulness practice evidenced by the RCT in chapter 4 and re-affirmed by the interviews in chapter 5, increased participants' cognitive control over the processing of difficult thoughts and emotions. This appears to have helped MBCT participants to modulate their responses to stress by decentering from stress appraisals into a metacognitive mode (Arch & Landy, 2015; Brown et al., 2007). Approaching difficult thoughts and emotions in a manner, which concurs with Moos (2002; 1984) stress coping theory, appears to have allowed improved wellbeing for the MBCT participants through increased positive appraisals of participants' environments and of difficult situations, thoughts and emotions as they occurred (Lazarus & Folkman, 1994).

This thesis did not provide evidence that attention regulation could be a key predictor of anxiety. None of the interviewees explicitly mentioned that they felt their capacity to regulate their attention reduced their anxiety either directly or indirectly. In chapter 6, no conditional direct or indirect effects of changes in attention regulation scores anxiety were found. These findings contradict the CBPM.

### 7.2.5 Acceptance

The evidence from the SEM study in chapter 3 suggests that acceptance is significantly associated with anxiety both directly and indirectly through mediated relationships with worry and rumination. These results were further corroborated with the qualitative interviews in chapter 5 where the interviewees identified how, in a manner consistent with Moos (2002; 1984), increased acceptance allowed MBCT participants to approach difficult thoughts and emotions, which led to them feeling less anxious. These findings are consistent with the CBPM but were not supported by the moderated mediation study; however, this may have been due to a lack of power to detect small to medium moderated mediation pathways in this study. None of the empirical studies found evidence to suggest that improvements in acceptance predicted the CBPM outcomes through a mediated relationship with reduction in worry and rumination. This appears to undermine the CBPM hypothesis that worry and rumination would play a role in acceptance's relationship with anxiety. The findings of acceptance being significantly associated with anxiety are consistent with the longitudinal analysis of Lloyd and Hastings (2008), and the cross-sectional findings of Kostyla et al. (2013) and Zalewska et al. (2007) who found that acceptance was a significant predictor of anxiety in psoriasis patients. The finding of increased acceptance being a direct predictor of wellbeing is also consistent with the RCT ( $N =$

93) carried out by Fledderus et al. (2010), which assessed an intervention based on acceptance and commitment therapy and MBSR; enhancement of acceptance (measured by the AAQ-II) during the intervention mediated the effects of the intervention on the psychological wellbeing of adults with mild to moderate psychological distress.

#### 7.2.6 Non-attachment

The evidence from the SEM study in chapter 3 suggests that non-attachment is significantly associated with wellbeing. This result is supported by qualitative interviews in chapter 5 where the interviewees identified how improvements in their capacities to be less attached to difficult thoughts and emotions improved their wellbeing. These findings are consistent with the CBPM. These findings were not supported by the moderated mediation study, as with the other CBPM variables however, this may have been due to a lack of power to detect small to medium moderated mediation effects. None of the empirical studies found evidence to suggest that improvements in non-attachment predicted the CBPM outcomes through a mediated relationship with reduction in worry and rumination. This appears to undermine the CBPM hypothesis that worry and rumination would play a role in non-attachment's relationship with wellbeing. The finding of non-attachment having a significant association with wellbeing is supported by traditional Buddhist writings (e.g., Abhidhamma Pitaka as summarized by; Mendis 2006; Narada Maha Thera, 1987). These writings typically hypothesise that wellbeing will be directly improved by reducing tendencies towards attachment to internal and external phenomena, which facilitates emotional regulation (Shapiro, 2006; Kumar, 2003). These results are also consistent with the empirical findings of Coffey and Hartman (2008) and Sahdra et al.

(2010) who found that lower levels of attachment significantly predicted improved wellbeing and mood. This finding is also consistent with a correlational study of 186 college students carried out McIntosh and Martin (1992), which found that greater non-attachment predicted happiness. The idea that being a more non-attached person is likely to lead to a person having improved wellbeing is also supported by the theories of Gross and Munoz (1995), Lazarus and Folkman (1984) and Weinstein et al. (2009) who hypothesize that having a less attached and more open stance may be associated with less negative appraisals of situations as stressful, which could then underpin increases in wellbeing.

#### 7.2.7 Depression

The evidence from this thesis suggests that the CBPM may not be a good explanatory model of how changes in the depression of psoriasis patients might occur. When the evidence across this thesis is synthesized, the six CBPM domains were not found to be significantly associated with the depression of psoriasis patients. There is no literature on the potential direct relationships between aversion, non-attachment (which are both new concepts to the mindfulness literature), acceptance, attention regulation and depression of any clinical population. The empirical literature on the CBPM domains has generally focused on their relationships with anxiety and wellbeing. This thesis is the first that the author is aware of which tested the potential relationships between these variables with psoriasis patient depression. The findings that both self-compassion and mindfulness were not associated with depression in this thesis, is not consistent with a number of empirical studies, conducted in a number of countries with different clinical and non-clinical populations (e.g., Gu et al., 2015; Hölzel et al., 2011; Kuyken et al., 2010). The difference between the literature on the

likely impact of self-compassion and mindfulness on the depression of psoriasis patients and the moderated mediation study in this thesis may be due to the underpowered nature of this study. In this study, changes in mindfulness and self-compassion post MBCT intervention both had small associations with changes in depression, so it appears based on the underpowered nature of this study that this study failed to detect them. Another factor, which may have compounded this methodological limitation, may be that the effect of MBCT on the depression scores in the intervention group in the RCT appears to have been due to large improvements in 10 (approximately 20%) of the participants. These participants moved from abnormal and borderline abnormal ranges on the HADS-D to the normal range after the intervention. The remaining sample showed little variation in depression scores post intervention, which may be due to the low levels of depression experienced at baseline. It is important that future studies that investigate the relationships between the CBPM domains and depression symptoms of psoriasis patients use larger sample sizes of patients, ideally with more chronic depressive symptoms, e.g., psoriasis patients with acute depression symptoms, at baseline in order to examine these effects without such limitations. These differences could also be due to the use of the HADS-D to measure depression in this thesis, and the aforementioned literature on mindfulness and self-compassion using the 21-item Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) to measure depression. The restricted range on the HADS-D when compared to the BDI-II may also have led to reduced correlations being found in this thesis versus this literature (Furr, 2017). The BDI-II may also potentially be a more sensitive measure of depression than the HADS-D (Cameron et al., 2011). Future studies, which attempt to measure the relationship between self-

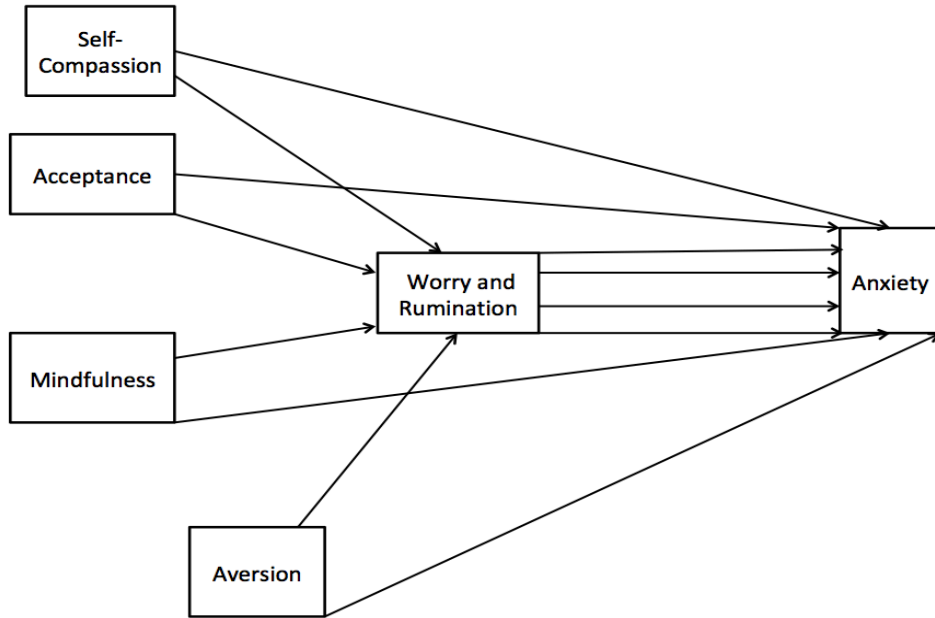
compassion, mindfulness and depression, may therefore benefit from measuring depression with the BDI-II rather than the HADS-D.

#### 7.2.8 Refined CBPM models

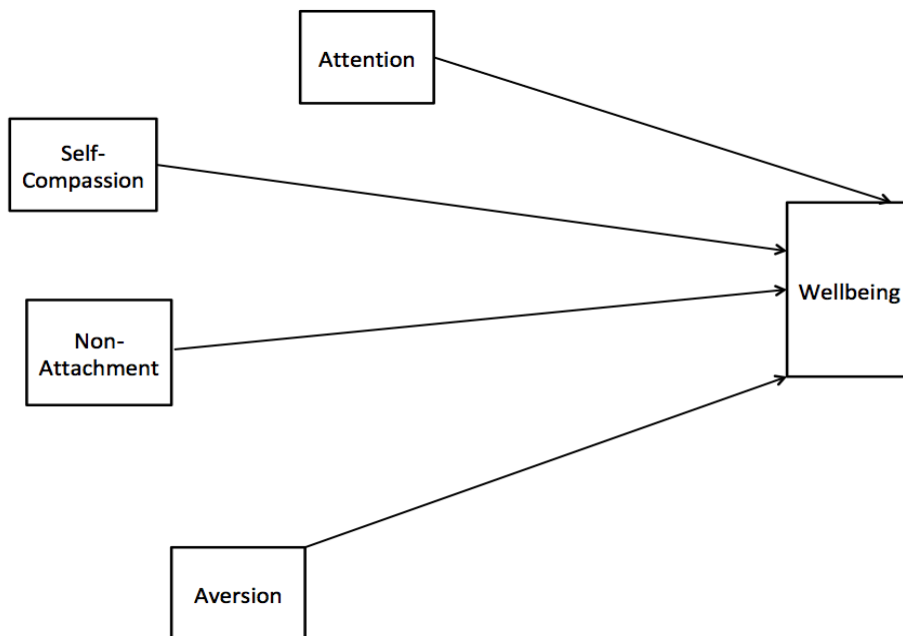
Mindfulness practice is a rich and complex phenomenon, which has been practiced, analyzed, and debated for centuries in Buddhist traditions and has received significant attention in the medical and psychological literatures in the last two decades (Baer, 2003; Carlson, 2015; Gu et al., 2015). The development of testable theories are important to the advancement of our understanding of how mindfulness practice leads to beneficial outcomes in clinical settings (Van der Velden et al., 2015). In order to meet this thesis's aim of providing a greater understanding of and potentially help to identify the mechanisms of action of mindfulness, an initial complex model such as the CBPM, which may be refined through empirical testing was necessary to begin this thesis with. The results from this thesis, when the strengths and limitations of each study are taken into account (e.g., the large number of participants in chapter 3, the lack of power to detect small to medium moderated mediated effects in chapter 6, and the fact that social desirability responding may have produced biased interview data in chapter 5) indicate that this thesis has provided preliminary empirical evidence for each of the 6 CBPM domains being significantly associated with either the anxiety or wellbeing of psoriasis patients, with evidence for aversion and self-compassion being associated with both. It also appears that the significant pathways between the CBPM domains (self-compassion, acceptance, mindfulness and aversion) and anxiety are both direct and mediated, whereas the CBPM domains (attention regulation, self-compassion, non-attachment and aversion) appear to have a direct relationship with wellbeing alone. These refined CBPM



models of psoriasis patient anxiety and wellbeing, based on the BPM (Grabovec et al., 2011), the western literature on potential mechanisms of action of mindfulness and the evidence from this thesis are presented in Figure 7-1 and Figure 7-2 below.



**Figure 7-1.** Refined CBPM for anxiety.



**Figure 7-2.** Refined CBPM for wellbeing.

### 7.3 Contribution to the relevant literatures

This thesis makes an important contribution to clinical literature on how to support psoriasis patient anxiety, depression and wellbeing. This thesis does so by providing empirical evidence that indicates that MBCT is associated with improvements in self-reported psoriasis, anxiety, depression and wellbeing of psoriasis patients.

This thesis also provides preliminary empirical support for CBPM models of anxiety and wellbeing as potentially useful explanatory frameworks in understanding how improvements in psoriasis patient anxiety and wellbeing may accrue. It is clear from these findings that change processes involved with mindfulness are complex, with a variety of significant direct and mediated effects between found between the individual CBPM domains, mediating variables and the anxiety and wellbeing of psoriasis patients. The identification of each significant direct and mediated relationship between the CBPM domains and anxiety and wellbeing are important contributions to the mindfulness and psychological literature. However, the major contribution of this PhD thesis, to the growing literature, which attempts to examine and explain the potential mechanisms of mindfulness, could be the condensing of a vast array of mindfulness mechanisms into reasonably well-supported integrative CBPM models of anxiety and wellbeing. In doing so, this PhD provides a framework on which further studies can focus, in order to examine what the mechanisms of mindfulness are for different health and mental health issues. This is important as it provides a pathway for future research to investigate potential mechanisms through which mindfulness might exert its beneficial effects, by either replicating the CBPM models of anxiety and wellbeing, or if not using these particular models, modelling

their variables of action in such a manner that emphasise the complex direct and mediated interactions between the dependent and independent factors.

#### 7.4 Future Research

It appears, based on this PhD's results, that MBCT is effective in improving the self-reported psoriasis, wellbeing, anxiety and depression of psoriasis patients. However, these results need to be substantiated by further higher-quality research. In order to more clearly evaluate the effectiveness of MBCT, future research that evaluates its effects should use active control groups as part of an RCT.

In order to more rigorously investigate the conditional direct and indirect effects of changes in the CBPM domains on psoriasis patient anxiety, depression and wellbeing, higher powered studies are required in order to ensure that the Type I and Type II errors are balanced appropriately. In order to ensure a power of .8 to detect small to medium moderated mediation effects using bias-corrected bootstrapping, 462 participants are required. This number was identified by Fritz and MacKinnon (2007) in their simulation study testing for these effects using various combinations of parameters.

In order to be able to make causal inferences about the relationships between the CBPM domains, mediating and outcome variables, future research could use longitudinal designs with control groups in order to explore these phenomena further. This would also allow a clearer and more in-depth picture of the longer-term impact of MBCT on psoriasis patients' levels of anxiety, depression and wellbeing to emerge.

Overall this PhD provides support for the promising potential of refined CBPMs of anxiety and wellbeing as theories to understand the mechanisms of action by which mindfulness may operate. Further research replicating these CBPM models, either with psoriasis or other patient groups are needed to establish the validity and reliability of these CBPMs over time and across clinical and nonclinical populations.

This thesis did not find evidence that the CBPM domains have a mediated relationship with wellbeing through reduced rumination and worry (which represented the concept mental proliferation from the original BPM). Another variable, which may be a candidate; to represent mental proliferation as a mediator between the CBPM domains and wellbeing in future studies, could be cognitive reactivity. Cognitive reactivity refers to the degree to which a mild dysphoric state reactivates negative thinking patterns (Raes et al., 2009). MBCT aims to address cognitive reactivity (Segal et al., 2002). Psychological wellbeing might be improved through the disengaging from automatic and maladaptive modes of cognitive reactivity through increased attention regulation, self-compassion, non-attachment, and aversion (Harrington & Loffredo, 2010). Future RCT studies could investigate if cognitive reactivity is reduced after engagement in an MBCT intervention and also attempt to identify if cognitive reactivity has mediating role in the relationships between changes in the CBPM domain scores and psychological wellbeing scores after engagement in an MBCT intervention.

### 7.5 Implications for practice

The RCT study highlights the suitability of delivery of MBCT to psoriasis patients who were within this study's inclusion and exclusion criteria. The majority of

the psoriasis patients in the RCT study attended most of the mindfulness classes and the low attrition rate appears to be an indication of their relevance to the patients. None of the participants in either MBCT group reported that they had a negative experience having engaged with the group, with a number of patients noting that they would recommend this course to others. The high level of support for the MBCT course may be explained by the fact that: 1) the MBCT course addressed the issue of how to handle psychological distress and improve wellbeing – a topic of direct relevance to a large proportion of the patients; 2) the course taught a broad set of mindfulness techniques, which could be readily applied to the challenges faced in the course of a typical patient day; 3) the training provided a supportive group experience in which the patients could share and learn from each other and strengthen relationships with their fellow group members. The fact that there is a lack of other psychological supports available to this patient population, and that the sample for this study sought entry to the RCT means that recruitment bias being a factor in the relevance of the content to this sample cannot be ruled out.

MBCT was effective in improving self-reported psoriasis, anxiety, depression and wellbeing of psoriasis patients. These results mean that if MBCT is replicated using independent samples in different contexts, then it could be added to the set of clinical interventions that mental health professionals use to support the physical and mental health of psoriasis patients. Thus, both dermatologists and mental health professionals should be prepared to talk with their patients about the potential role that MBCT could have in addressing their anxiety, depression and wellbeing issues.

The original MBCT training programme was designed for people with a history of depression (and not for people with issues with wellbeing or anxiety) (Segal et al., 2002). MBCT requires a commitment of attendance to a 2.5- hour group session and to 45 to 60 minutes of mindfulness practice each day for 8 weeks. This may be quite an onerous commitment to people who are still working and active socially. The required time commitment on a weekly and daily basis was identified as a challenge to MBCT participants in the RCT in chapter 4. The greater understanding that this thesis offers of what the potential predictors and mediators of the anxiety and wellbeing of psoriasis patients might be, may allow MBCT to be refined. This could potentially increase its potency, or allow the development of a new intervention based on the CBPM to be developed to support the anxiety and wellbeing of psoriasis patients (Kraemer et al., 2002). One of the main strengths of the CBPMs for anxiety and wellbeing as theories for practice is that they provides six key domains that can be targeted for improvement each week. This means a six-week course with a 2.5- hour group session, which uses the same meditative techniques as MBCT and other psychological intervention techniques (e.g., psycho-education) could be developed. The format of each week could focus on how to improve each CBPM domain, with increased teaching about how each domain might relate to ruminative and worried thinking and how improving each might lead to improvements in anxiety. An example of such a refinement would be to explicitly focus on the importance of self-compassion, which was found to be significantly associated with both anxiety and wellbeing in this thesis, in one of the weekly sessions. Self-compassion was found to improve through MBCT group participation in chapter 4, even though it is not explicitly focused on in MBCT (Segal et al., 2002). The increased focus that could be placed on self-compassion in a refined intervention coupled with the addition of

exercises, which have received empirical support for their capacity to improve self-compassion e.g. writing a self-compassionate letter to oneself on something a person, might feel ashamed or insecure about (Neff & Germer, 2012) may lead to improved anxiety and wellbeing for psoriasis patients, in line with the CBPM. This shortened and more focused format may also lead to more participant compliance with the intervention, as it would be less time consuming to engage with (Kraemer et al., 2002). This shortened more pragmatic 6 week instead of an 8 week format may not impact negatively the effect of this MBI on the anxiety and wellbeing of psoriasis patients. Carmody and Baer (2009) examined effect sizes for psychological outcome variables in published studies of MBSR ( $N = 30$ ), some of which had adapted the standard number of class hours (ranging from 6-28 hours in total intervention hours) and weekly sessions (ranging 4-10 weekly sessions). The correlation between mean effect size on psychological distress and number of in-class hours was non-significant for both clinical and nonclinical samples. This suggests that adaptations that include less class time may be worthwhile for populations, such as psoriasis patients, for whom reduction of psychological distress is an important goal and for whom longer time commitment may be a barrier to their ability or willingness to participate.

## 7.6 Implications for theory

This thesis has provided promising preliminary empirical support for clinically modified Buddhist Psychological Models of anxiety and psychological wellbeing outlined above in Figures 7-1 and 7-2. The following discussion on the implications of this thesis for theory will focus on these two CBPM models. These models incorporate the theories of traditional Buddhist psychology and more recent psychological theories on the avoidance function of worry (Borkovec, 1994),

rumination (Nolan-Hoeksema, 2004), and stress coping theories on cognitive appraisal (Lazarus & Folkman, 1984) and approach coping (Moos 2002; 1984).

### 7.6.1 Integrative mindfulness models

As outlined in chapter 2, the mindfulness literature has provided partial preliminary evidence for a variety of individual mechanisms that mediate the effectiveness of mindfulness interventions on mental health outcomes and wellbeing e.g., self-compassion (Neff, 2003), increased acceptance (Keng et al., 2011) mindfulness (Kuyken et al., 2010) and decreased rumination (Chiesa, Anselmi, & Serretti, 2014; Gu et al., 2015; Keng et al., 2011; Shahar, Britton, Sbarra, Figueredo, & Bootzin, 2010). A limited number of integrative models/theories which might explain how engaging in mindfulness practice might impact the anxiety and wellbeing of clinical and non-clinical populations exist in the literature. Baer (2003), Holzel et al. (2011) and Shapiro et al. (2006) proposed such models which were outlined in chapter 2. The refined CBPM models of anxiety and wellbeing help to fill some of the gaps in the mindfulness literature by providing integrative models, which contribute to a better understanding of the possible direct predictor and mediated relationships between four CBPM domains, its mediating variables and anxiety, and the possible direct relationships between four CBPM domains and wellbeing (Kazdin, 2007; Van der Velden et al., 2015). The refined CBPM for wellbeing supports the role that Baer (2003), Holzel et al. (2011) and Shapiro et al. (2006) ascribe to attention regulation as being a potentially important mechanism of action of changes in wellbeing. The CBPM for anxiety also supports the role that Baer (2003) hypothesized that increased acceptance may have on the improvement of mental health outcomes such as anxiety. The refined CBPMs for anxiety and wellbeing however additionally highlight the



importance of self-compassion, mindfulness, non-attachment and aversion as potentially important mindfulness mechanisms of action. These variables were not present in the theories of Baer (2003), Holzel et al. (2011) or Shapiro et al. (2006).

### 7.6.2 Anxiety and wellbeing

The refined CBPM models for anxiety and wellbeing share some theoretical synergies with, but also diverge theoretically from the theories underpinning CBT and ACT (Hofman, Sawyer, & Fang, 2010). These synergies and divergences are mainly related to how improvements in the anxiety and wellbeing of psoriasis patients are understood, and how improvements in each can accrue. These will be discussed below, along with the two theoretical contributions that these two CBPM models potentially make to the literature on how to support psoriasis patient groups with issues with anxiety and wellbeing.

#### 7.6.2.1 Focuses on both positive and negative affect

Unlike most theoretical models (e.g., CBT or ACT) in psychology, which may be supportive in helping to understand how psoriasis patient anxiety might be improved, the CBPM does not simply focus on how to change enduring affective traits, e.g., tendencies to ruminate or worry, that have been developed and are contributing to psychopathology, e.g., anxiety (Garland, Farb, Goldin, & Fredrickson, 2015). CBT and ACT both provide theoretical explanations for the therapeutic benefits of their problem focused and behaviorally-based interventions and how these may impact anxiety (Garland et al., 2015). Both models however, exhibit an explanatory gap in how they may promote eudemonic wellbeing (Garland et al., 2015). The CBPM fills this explanatory gap by providing a means of cultivating

positive attributes, e.g., a more self-compassionate attitude, which is likely to lead to increased positive affect and wellbeing, regardless of underlying mental health issue morbidity (Garland et al., 2015). The main vehicle by which the CBPM can achieve this positive affect is through mindfulness practice (e.g., meditation through the body scan is the main practice in MBCT), which is not focused on in either CBT or ACT (Hayes, 2004). It is through this mindfulness practice, which enhances each CBPM domain, and the mechanistic process outlined in the CBPM, that psychological wellbeing (Ryff, 1989), which is in line with eudemonic theories of wellbeing might be facilitated (Ryan & Deci, 2001). Ryff (1995) defined psychological wellbeing as a process of self-realization, consisting of six dimensions: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. The CBPM provides a theoretical pathway through which each of these domains can be improved through the enhanced self-determination that comes with learning new mindfulness skills and techniques and regular practice of each. Thus, the CBPM as a theory may be attractive to clinicians and patients who are focused on wider life concerns, and not just symptom removal.

#### 7.6.2.2 Cognition, emotion regulation and distress

CBT and ACT share many of the same techniques to reduce emotional distress. Both treatment modalities are problem focused and behaviorally based interventions that involve the patient in a collaborative relationship with the objective of solving clearly identifiable and achievable goals (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hofmann & Asmundsen, 2008). However, they differ in relation to the specific emotion regulation strategy that is promoted by each intervention (Hofmann & Asmundsen, 2008). ACT targets experiential avoidance and the attempts to manage

unpleasant emotions through suppression and other dysfunctional emotion regulation strategies (Hayes et al., 2006). In contrast, CBT primarily focuses on the emotion-eliciting stimulus itself — the situation or event that generates the emotional experience and the thoughts which manifest due to it (Hofmann & Asmundsen, 2008). In essence, CBT and ACT target different stages in the emotion-generative process: ACT counter-acts maladaptive response-focused emotion regulation strategies, whereas CBT promotes adaptive antecedent-focused emotion regulation strategies by changing the content of thought (Hofmann & Asmundsen, 2008; Hofman et al., 2010). The operationalization of Buddhist and western concepts of mindfulness into an innovative integrative framework such as the CBPM, could have benefits for the treatment of anxiety, due to its potential to target both maladaptive response-focused and adaptive antecedent-focused emotion regulation strategies (Chiesa et al., 2014; Williams & Kabat-Zinn, 2011).

#### 7.6.2.3 CBPM maladaptive response-focused strategies

In conventional CBT, anxiety is conceptualized as a disturbance in information processing that leads to an overestimation of danger and an associated underestimation of personal ability to cope (Beck, Emery, & Greenberg, 1985). Conventional CBT attempts to ameliorate anxiety by replacing maladaptive cognitions with beneficial cognitions through systematic examination of the individual's distorted thinking. In doing so, the aim of CBT is to interrupt the recurrent over-activation of the fight- flight-system characteristic for anxiety disorders (Vollestad et al., 2012). In contrast to CBT but in a similar manner to ACT, the CBPM for anxiety does not emphasize the need to replace maladaptive cognitions (Craske et al., 2010; Grabovac et al., 2011). Instead, the CBPM, like ACT, offers the

possibility of a shift in the patient's relationship with the anxiety symptoms they are experiencing, by becoming less identified with his or her own thoughts (e.g., worried or ruminative thought; Kabat-Zinn, 1994). The refined CBPM for anxiety, like the theories underpinning ACT, identify that in order for this to occur the maladaptive response-focused emotion regulation strategy of aversion (or experiential avoidance in ACT parlance) needs to be counteracted. The theories underpinning ACT, like the CBPM, encourage participants to approach unwanted thoughts and feelings – such as pain, and guilt – as an alternative to experiential avoidance, through the use of acceptance, mindfulness and cognitive defusion (referred to as attention regulation in the CBPM), which then reduces anxiety symptoms (Fung, 2015; Hayes et al., 2006). The CBPM for anxiety differs from the theories underlying ACT in that it does not subscribe a role to attention regulation in the improvement of anxiety. This is due to the lack of evidence of a relationship between attention regulation and anxiety in this thesis. The CBPM for anxiety also differs from ACT and potentially adds to the theoretical literature, by highlighting the potential role that increased self-compassion could play as an approach coping strategy (which is absent in ACT) as part of an integrative model in reducing anxiety (Moos, 2002; 1984).

#### 7.6.2.4 CBPM adaptive antecedent-focused regulation strategies

The CBPM for anxiety is similar to CBT in how it hypothesizes that psoriasis patient anxiety could be supported through antecedent-focused regulation strategies. The CBPM for anxiety, like CBT, allows for a systematic evaluation of the content of cognitions, feelings or behaviours (Craske et al., 2010; Grabovac et al., 2011). The CBPM for anxiety and CBT both identify that increased acceptance of uncomfortable or threatening cognitions, feelings and arousing sensations as they occur, allows for

more adaptive positive re-appraisals of these stimuli (Hofman, 2012; Lazarus & Folkman, 1984). In the CBPM for anxiety, it is through repeated mindfulness practice that associations between emotionally evocative or threatening stimuli and negative cognitive appraisals (e.g., through worry or rumination) can become increasingly less salient and more adaptive cognitive reappraisals may become increasingly dominant (Lynch et al., 2015). In conventional CBT for anxiety, it is through attention modification, psychoeducation and cognitive restructuring in one-to-one sessions with a CBT therapist (Hofman, 2012). The positive re-appraisal that results from these different practices in both the CBPM for anxiety and CBT has the same effect, of disrupting the over-attachment or fusion to worried or ruminative thoughts (Borkovec, 1994; Hayes et al., 2013; Nolan-Hoeksema, 2000), which then leads to reduced anxiety. The evidence from this thesis suggests that increased mindfulness practice is associated with increased self-compassion and mindfulness. The CBPM for anxiety outlines that it is through the approach oriented CBPM domains such as self-compassion and mindfulness (along with increased acceptance and reduced aversion) that difficult thoughts and emotions are reappraised (Brown et al., 2015). Conventional CBT for anxiety does not subscribe a role to self-compassion or mindfulness in cognitive re-appraisal or in the amelioration of anxiety (Hofman, 2012). This appears to be a key difference between the CBPM for anxiety and CBT for anxiety, and this appears to be due to the mode of therapeutic delivery. Later versions of CBT for anxiety do highlight the role that meditation can play in relaxing a client when they are worrying, but its role is limited to this (Hofman, 2012). The addition of self-compassion and mindfulness as additional antecedent-focused regulation strategies, enhanced through mindfulness practices, could therefore be a useful addition to the theory on how to support psoriasis patient anxiety.

#### 7.6.2.5 Theoretical examples of both strategies

The CBPM for anxiety, through regular mindfulness practice and the development of the four approach oriented domains (self-compassion, acceptance, mindfulness and aversion), creates a means by which a maladaptive response focus can be counteracted and adaptive antecedent-focused emotion regulation strategy can be supported. For example, a person with psoriasis is due to go to the swimming pool but is experiencing anxiety about attending. The person is worried that their psoriasis might flake and be stigmatized due to this. The person's thoughts are also ruminative in nature as the person is remembering a time when he was a child and was teased at a swimming pool for his psoriasis flaking. In this situation, following the CBPM theory, in order to ameliorate their anxiety, the person with psoriasis could practice mindfulness, e.g., using the breath, or by engaging in a longer body scan exercise. In line with the CBPM for anxiety, this could counteract the maladaptive response focused aversion the person was experiencing, through the approaching of his or her own worried or ruminative thoughts with increased mindfulness. This increased mindfulness could change his relationship with his thoughts, by allowing him to focus on the present moment and let the worried and ruminative thoughts to pass.

In line with the CBPM for anxiety, the engagement in mindfulness practice may also allow an adaptive antecedent-focused emotion regulation strategy to be attained. In line with the CBPM for anxiety, the mindfulness practice that the person would have engaged would have allowed self-compassion to accrue. This may allow the person to be less self-critical about how his psoriasis looks, which may reduce the threat of potential stigmatization at the swimming pool (cognitive re-appraisal) allowing the worry and rumination they had been experiencing and the resultant

anxiety to diffuse (Lynch et al., 2015). Thus, the CBPM theoretically, and any subsequent intervention based on this theory could offer psoriasis patients both maladaptive response-focused and adaptive antecedent-focused strategies with which to improve anxiety through mindfulness practice.

## 7.7 Conclusion

A series of studies were employed in this PhD to: (1) investigate the effectiveness of MBCT on self-reported psoriasis, anxiety, depression and wellbeing along with the CBPM's domain and mediating variables; and (2) to investigate if the CBPM domain and mediating variables may have a role in predicting the anxiety, depression and wellbeing levels of psoriasis patients in line with a clinically modified Buddhist Psychological Model. The results from this PhD indicate that MBCT is an effective intervention in improving each of the CBPM domain, mediating and outcome variables, in varying degrees, in the immediate and short term. The triangulated empirical evidence from this PhD is also broadly supportive of the hypothesis set out in the CBPM theory that changes in the CBPM domains may predict changes in psoriasis patients' anxiety and wellbeing directly, and anxiety when mediated through changes in worry and rumination. This PhD's results also have some potentially useful practice and theoretical implications. The RCT study from this PhD highlights the effectiveness of, and the suitability of delivery of MBCT to psoriasis patients who would like to improve their anxiety, depression and wellbeing levels. The PhD's triangulated results also provide evidence for the potentially usefulness of refined CBPMs for anxiety and wellbeing, as theoretical roadmaps which may be supportive to clinicians, in order to help them to support psoriasis patients with anxiety and/or wellbeing issues.

## References

---

- Agee, J. D., Danoff-Burg, S., & Grant, C. A. (2009). Comparing brief stress management courses in a community sample: Mindfulness skills and progressive muscle relaxation. *Explore: The Journal of Science and Healing*, 5(2), 104-109. doi:10.1016/j.explore.2008.12.004
- Akaike H. (1987) Factor Analysis and AIC. In: Parzen E., Tanabe K., Kitagawa G. (eds) *Selected Papers of Hirotugu Akaike*. Springer Series in Statistics (Perspectives in Statistics). Springer, New York, NY. doi:10.1007/978-1-4612-1694-0\_29
- Allen, M., Dietz, M., Blair, K. S., van Beek, M., Rees, G., Vestergaard-Poulsen, P., ... Roepstorff, A. (2012). Cognitive-affective neural plasticity following active-controlled mindfulness intervention. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, 32(44), 15601–15610. doi: 10.1523/JNEUROSCI.2957-12.2012
- Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The Daily Inventory of Stressful Events: An interview-based approach for measuring daily stressors. *Assessment*, 9(1), 41-55. doi: 10.1177/1073191102091006
- Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science*, 14(2), 64-68. doi: 10.1111/j.0963-7214.2005.00336.x
- Amatya, B., Wennersten, G., & Nordlind, K. (2008). Patients' perspective of pruritus in chronic plaque psoriasis: a questionnaire-based study. *Journal of the European Academy of Dermatology and Venereology*, 22(7), 822-826. doi: 10.1111/j.1468-3083.2008.02591.x



- American Psychiatric Association (2013). Statistical manual of mental disorders: DSM-5 (ed.) *American Psychiatric Association. Washington, DC.*
- American Psychological Association (2008). Encyclopedia of Psychology. *American Psychological Association. Washington, DC.*
- Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy, 44*(12), 1849-1858. doi:10.1016/j.brat.2005.12.007
- Arch, J. J., Ayers, C. R., Baker, A., Almklov, E., Dean, D. J., & Craske, M. G. (2013). Randomized clinical trial of adapted mindfulness-based stress reduction versus group cognitive behavioral therapy for heterogeneous anxiety disorders. *Behaviour Research and Therapy, 51*(4-5), 185-196. doi:10.1016/j.brat.2013.01.003
- Arch, J.J., & Landy, L.N. (2015). Mindfulness and emotional benefits. In K.W. Brown, J.D. Creswell & R.M. Ryan, (Eds.), *Handbook of Mindfulness: Theory, Research and Practice (pp. 208-224)*. New York, NY, US: Guilford Press.
- Armstrong, A. W., Schupp, C., Wu, J., & Bebo, B. (2012). Quality of life and work productivity impairment among psoriasis patients: findings from the National Psoriasis Foundation survey data 2003–2011. *PloS one, 7*(12), e52935. doi:10.1371/journal.pone.0052935
- Augustin, M., & Radtke, M. A. (2014). Quality of life in psoriasis patients. *Expert Review of Pharmacoeconomics & Outcomes Research, 14*(4), 559-568. doi: 10.1586/14737167.2014.914437
- Ayala, F., Sampogna, F., Romano, G. V., Merolla, R., Guida, G., Gualberti, G., ... & Daniele Study Group. (2014). The impact of psoriasis on work-related

- problems: a multicenter cross-sectional survey. *Journal of the European Academy of Dermatology and Venereology*, 28(12), 1623-1632. doi: 10.1111/jdv.12233.
- Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science & Practice*, 10, 125–143. doi:10.1093/clipsy.bpg015
- Baer, R.A., Smith, G.T., & Allen., K.B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, 11(3), 191–206. doi: 10.1177/1073191104268029
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, 13(1), 27-45. doi: 10.1177/1073191105283504
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., ... & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, 15(3), 329-342. doi: 10.1177/1073191107313003
- Baer, R. A., Lykins, E. L., & Peters, J. R. (2012). Mindfulness and self-compassion as predictors of psychological wellbeing in long-term meditators and matched nonmeditators. *The Journal of Positive Psychology*, 7(3), 230-238. doi: 10.1080/17439760.2012.674548
- Barlow, D. H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed.). New York, NY, US: Guilford Press.
- Barnard, L. K., & Curry, J. F. (2011). Self-compassion: Conceptualizations, correlates, & interventions. *Review of General Psychology*, 15(4), 289-303. doi:10.1037/a0025754

- Barnes, S. M., & Lynn, S. J. (2010). Mindfulness skills and depressive symptoms: A longitudinal study. *Imagination, Cognition and Personality, 30*(1), 77-91. doi: 10.2190/IC.30.1.e
- Batchelor, M. (2011). Meditation and mindfulness. *Contemporary Buddhism, 12*(01), 157-164. doi: 10.1080/14639947.2011.564832
- Batink, T., Peeters, F., Geschwind, N., van Os, J., Wichers, M. (2013) How Does MBCT for Depression Work? Studying Cognitive and Affective Mediation Pathways. *PLoS ONE 8*(8): e72778. doi: 10.1371/journal.pone.0072778
- Beck, A. T., Rush, A. J., & Shaw, B. F., Emery, G. (1979). *Cognitive Therapy of Depression*. New York, NY, US: Guilford Press.
- Beck, A. T., Emery, G., & Greenberg, R. L. (1985). *Anxiety disorders and phobias: A cognitive perspective*. New York: Basic Books.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). Beck depression inventory-II. *San Antonio, 78*(2), 490-498. TX: Psychological Corporation.
- Beck, A. T., & Steer, R. A. (1993). Beck Anxiety Inventory manual. *San Antonio, TX: The Psychological Corporation*.
- Beevers, C. G., Wenzlaff, R. M., Hayes, A. M., & Scott, W. D. (1999). Depression and the ironic effects of thought suppression: Therapeutic strategies for improving mental control. *Clinical Psychology: Science and Practice, 6*, 133–148. doi:10.1093/clipsy.6.2.133
- Bédard, M., Felteau, M., Marshall, S., Cullen, N., Gibbons, C., Dubois, S., ... & Gainer, R. (2014). Mindfulness-based cognitive therapy reduces symptoms of depression in people with a traumatic brain injury: results from a randomized controlled trial. *The Journal of Head Trauma Rehabilitation, 29*(4), E13-E22. doi: 10.1097/HTR.0b013e3182a615a0

- Bentler, P. M., & Chou, C. P. (1987). Practical issues in structural modeling. *Sociological Methods & Research*, 16(1), 78-117. doi: 10.1177/0049124187016001004
- Bewley, A. P., Fleming, C., & Taylor, R. (2012). Psychocutaneous medicine and its provision in the UK. *British Journal of Dermatology*, 167, 36. Retrieved from <https://insights.ovid.com/britishdermatology/bjdr/2012/07/001/psychocutaneous-medicine-its-provision/70/00002300>
- Beyer, V., & Wolverton, S. E. (2010). Recent trends in systemic psoriasis treatment costs. *Archives of Dermatology*, 146(1), 46-54. doi:10.1001/archdermatol.2009.319
- Bhosle, M. J., Kulkarni, A., Feldman, S. R., & Balkrishnan, R. (2006). Quality of life in patients with psoriasis. *Health and Quality of Life Outcomes*, 4(1), 35. doi: 10.1186/1477-7525-4-35
- Bialosiewicz, S., Murphy, K., & Berry, T. (2013). Do our measures measure up? The critical role of measurement invariance. *An Introduction to Measurement Invariance Testing: Resource Packet for Participants*. DC. Retrieved from: <http://comm.eval.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=63758fed-a490-43f2-8862-2de0217a08b8>
- Bieling, P. J., Hawley, L. L., Bloch, R. T., Corcoran, K. M., Levitan, R. D., Young, L. T., ... & Segal, Z. V. (2012). Treatment-specific changes in decentering following mindfulness-based cognitive therapy versus antidepressant medication or placebo for prevention of depressive relapse. *Journal of Consulting and Clinical Psychology*, 80(3), 365. doi: 10.1037/a0027483
- Biljan, D., Laufer, D., Filaković, P., Šitum, M., & Brataljenović, T. (2009). Psoriasis, mental disorders and stress. *Collegium Antropologicum*, 33(3), 889-892.

Retrieved from <https://hrcak.srce.hr/41841>

- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., ... & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*(3), 230-241. doi:10.1093/clipsy.bph077
- Bohlmeijer, E., Prenger, R., Taal, E., & Cuijpers, P. (2010). The effects of mindfulness-based stress reduction therapy on mental health of adults with a chronic medical disease: a meta-analysis. *Journal of Psychosomatic Research, 68*(6), 539-544. doi: 10.1016/j.jpsychores.2009.10.005
- Bollen, K.A. (1989). *Structural Equations with Latent Variables*. New York: Wiley.
- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., ... & Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire–II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy, 42*(4), 676-688. doi: 10.1016/j.beth.2011.03.007
- Boomsma, A. (1982). The robustness of LISREL against small sample sizes in factor analysis models. *Systems Under Indirect Observation: Causality, Structure, Prediction*, 149-173. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.11.684&rep=rep1&type=pdf>
- Borkovec, T. D., Robinson, E., Pruzinsky, T., & DePree, J. A. (1983). Preliminary exploration of worry: Some characteristics and processes. *Behaviour Research and Therapy, 21*(1), 9-16. doi: 10.1016/0005-7967(83)90121-3
- Borkovec, T. D. (1994). The nature, functions, and origins of worry. In G. C. L. Davey & F. Tallis (Eds.), *Wiley Series in Clinical Psychology. Worrying: Perspectives on Theory, Assessment and Treatment* (pp. 5–34). Oxford,

England: John Wiley & Sons.

- Borkovec, T. D. (2002). Life in the future versus life in the present. *Clinical Psychology: Science and Practice*, 9(1), 76-80. doi: 10.1093/clipsy.9.1.76
- Bostanov, V., Keune, P. M., Kotchoubey, B., & Hautzinger, M. (2011). Event-related brain potentials reflect increased concentration ability after mindfulness-based cognitive therapy for depression: a randomized clinical trial. *Psychiatry Research*, 199(3), 174-180. doi: 10.1016/j.psychres.2012.05.031
- Brady, B., & O'Regan, C. (2009). Meeting the challenge of doing an RCT evaluation of youth mentoring in Ireland: A journey in mixed methods. *Journal of Mixed Methods Research*, 3(3), 265-280. doi: 10.1177/1558689809335973
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult romantic attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment Theory and Close Relationships* (pp. 46-76). New York: Guilford Press.
- Brezinski, E. A., Dhillon, J. S., & Armstrong, A. W. (2015). Economic burden of psoriasis in the United States: a systematic review. *JAMA Dermatology*, 151(6), 651-658. doi: 10.1001/jamadermatol.2014.3593.
- Bridges, L. J., Denham, S. A., & Ganiban, J. M. (2004). Definitional issues in emotion regulation research. *Child Development*, 75(2), 340-345. doi:10.1111/j.1467-8624.2004.00675.x
- Brown, G. D., Neath, I., & Chater, N. (2007). A temporal ratio model of memory. *Psychological Review*, 114(3), 539. doi:10.1037/0033-295X.114.3.539

- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822. doi: 10.1037/0022-3514.84.4.822
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*(4), 211-237. doi: 10.1080/10478400701598298
- Brown, K. W., Weinstein, N., & Creswell, J. D. (2012). Trait mindfulness modulates neuroendocrine and affective responses to social evaluative threat. *Psychoneuroendocrinology, 37*(12), 2037-2041. doi:10.1016/j.psyneuen.2012.04.003
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822. doi: 10.1037/0022-3514.84.4.822
- Brown, K. W. (2015). Mindfulness training to enhance positive functioning. In Brown, K. W., Creswell, J. D., & Ryan, R. M. (Eds.). (2015). *Handbook of Mindfulness: Theory, Research, and Practice*, (pp 311-325). New York, NY, US: Guilford Press.
- Brown, K. W., Creswell, J. D., & Ryan, R. M. (Eds.). (2015). *Handbook of Mindfulness: Theory, Research, and Practice*. New York, NY, US: Guilford Press.
- Brown, T. A., Antony, M. M., & Barlow, D. H. (1992). Psychometric properties of the Penn State Worry Questionnaire in a clinical anxiety disorders sample. *Behaviour Research and Therapy, 30*(1), 33-37. doi: 10.1016/0005-7967(92)90093-V

- Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done?. *Qualitative Research*, 6(1), 97-113. doi: 10.1177/1468794106058877
- Byrne, B. M. (2012). *Multivariate Applications Series. Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*. New York, NY, US: Routledge/Taylor & Francis Group.
- Buchheld, N., & Walach, H. (2002). Mindfulness in Vipassana meditation and psychotherapy-Development of a mindfulness questionnaire. *Zeitschrift Fur Klinische Psychologie Psychiatrie und Psychotherapie*, 50(2), 153-172.
- Retrieved from:  
[https://www.researchgate.net/publication/284793460\\_Mindfulness\\_in\\_vipassana\\_meditation\\_and\\_psychotherapy\\_Development\\_of\\_the\\_Freiburg\\_mindfulness\\_questionnaire](https://www.researchgate.net/publication/284793460_Mindfulness_in_vipassana_meditation_and_psychotherapy_Development_of_the_Freiburg_mindfulness_questionnaire)
- Bundy, C., Pinder, B., Bucci, S., Reeves, D., Griffiths, C. E. M., & Tarrier, N. (2013). A novel, web-based, psychological intervention for people with psoriasis: the electronic Targeted Intervention for Psoriasis (eTIPs) study. *British Journal of Dermatology*, 169(2), 329-336. doi: 10.1111/bjd.12350
- Bundy, C., Borthwick, M., McAteer, H., Cordingley, L., Howells, L., Bristow, P., & McBride, S. (2014). Psoriasis: snapshots of the unspoken: using novel methods to explore patients' personal models of psoriasis and the impact on well-being. *British Journal of Dermatology*, 171(4), 825-831. doi: 10.1111/bjd.13101
- Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*, 13(1), 119. doi: 10.1186/1471-2458-13-119



- Bormann, J. E., Hurst, S., & Kelly, A. (2013). Responses to Mantram Repetition Program from Veterans with posttraumatic stress disorder: A qualitative analysis. *Journal of Rehabilitation Research & Development*, *50*(6). doi: 10.1682/JRRD.2012.06.0118.
- Camisa, C. (2005). *Handbook of Psoriasis 2<sup>nd</sup> Edition*. Blackwell Publishing.
- Cardaciotto, L., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: The Philadelphia Mindfulness Scale. *Assessment*, *15*(2), 204-223. doi: 10.1177/1073191107311467
- Carlson, L.E., (2015). Mindfulness-Based Interventions for Physical Conditions: A Selective Review. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook of Mindfulness: Theory, Research, and Practice* (pp. 405-425). New York, NY, US: Guilford Press.
- Carroll, C., Patterson, M., Wood, S., Booth, A., Rick, J., & Balain, S. (2007). A conceptual framework for implementation fidelity. *Implementation Science*, *2*(1), 40. doi: 10.1186/1748-5908-2-40
- Cameron, I. M., Crawford, J. R., Lawton, K., & Reid, I. C. (2008). Psychometric comparison of PHQ-9 and HADS for Measuring Depression Severity in Primary Care. *British Journal of General Practice*, *58*(546), 32-36. doi: 10.3399/bjgp08X263794
- Cameron, I. M., Cardy, A., Crawford, J. R., du Toit, S. W., Hay, S., Lawton, K., ... Reid, I. C. (2011). Measuring depression severity in general practice: discriminatory performance of the PHQ-9, HADS-D, and BDI-II. *British Journal of General Practice*, *61*(588), e419–e426. doi:10.3399/bjgp11X583209

- Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*(1), 23-33. doi: 10.1007/s10865-007-9130-7
- Carmody, J., Baer, R. A., LB Lykins, E., & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 65*(6), 613-626. doi: 10.1002/jclp.20579
- Carmody, J. (2015). Reconceptualizing mindfulness. In Brown, K. W., Creswell, J. D., & Ryan, R. M. (Eds.). *Handbook of Mindfulness: Theory, Research, and Practice*. (p. 62-78). New York, NY, US: Guilford Press.
- Cero, I., & Sifers, S. K. (2013). Parenting behavior and the interpersonal-psychological theory of suicide: A mediated moderation analysis with adolescents. *Journal of Affective Disorders, 150*(3), 987-992. doi: doi.org/10.1016/j.jad.2013.05.025
- Chadwick, P., Taylor, K. N., & Abba, N. (2005). Mindfulness groups for people with psychosis. *Behavioral and Cognitive Psychotherapy, 33*(3), 351-359. doi: 10.1017/S1352465805002158
- Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: reliability and validity of the Southampton mindfulness questionnaire (SMQ). *British Journal of Clinical Psychology, 47*(4), 451-455. doi: 10.1348/014466508X314891

- Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review, 29*(6), 560-572. doi: 10.1016/j.cpr.2009.06.005
- Chapman, B. P., & Moynihan, J. (2009). The brain–skin connection: role of psychosocial factors and neuropeptides in psoriasis. *Expert Review of Clinical Immunology, 5*(6), 623-627. doi:10.1586/eci.09.56
- Chardon, M. L., Janicke, D. M., Carmody, J. K., & Dumont-Driscoll, M. C. (2016). Youth internalizing symptoms, sleep-related problems, and disordered eating attitudes and behaviors: A moderated mediation analysis. *Eating Behaviors, 21*, 99-103. doi: 10.1016/j.eatbeh.2016.01.007
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling 14*, 464–504. doi: 10.1080/10705510701301834
- Chen, L. Y., Hsiao, B., Chern, C. C., & Chen, H. G. (2014). Affective mechanisms linking Internet use to learning performance in high school students: A moderated mediation study. *Computers in Human Behavior, 35*, 431-443. doi: 10.1016/j.chb.2014.03.025
- Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: a review and meta-analysis. *The Journal of Alternative and Complementary Medicine, 15*(5), 593-600. doi: 10.1089/acm.2008.0495
- Chiesa, A., & Serretti, A. (2010). A systematic review of neurobiological and clinical features of mindfulness meditations. *Psychological Medicine, 40*(8), 1239-1252. doi: 10.1017/S0033291709991747

- Chiesa, A. (2013). The difficulty of defining mindfulness: current thought and critical issues. *Mindfulness*, 4(3), 255-268. doi: 10.1007/s12671-012-0123-4
- Chiesa, A., Anselmi, R., & Serretti, A. (2014). Psychological mechanisms of mindfulness-based interventions: what do we know? *Holistic Nursing Practice*, 28(2), 124-148. doi: 10.1097/HNP.000000000000017
- Chun CA., Moos R.H., Cronkite R.C. (2006) Culture: A Fundamental Context for the Stress and Coping Paradigm. In: Wong P.T.P., Wong L.C.J. (eds) *Handbook of Multicultural Perspectives on Stress and Coping. International and Cultural Psychology*. Boston, MA: Springer. doi: 10.1007/0-387-26238-5\_2
- Chung, M. C., Allen, R. D., & Dennis, I. (2013). The impact of self-efficacy, alexithymia and multiple traumas on posttraumatic stress disorder and psychiatric co-morbidity following epileptic seizures: a moderated mediation analysis. *Psychiatry Research*, 210(3), 1033-1041. doi: 10.1016/j.psychres.2013.07.041
- Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review*, 13(2), 79-91. doi: 10.1177/1533210108316307
- Coffey, K. A., Hartman, M., & Fredrickson, B. L. (2010). Deconstructing mindfulness and constructing mental health: understanding mindfulness and its mechanisms of action. *Mindfulness*, 1(4), 235-253. doi: 10.1007/s12671-010-0033-2
- Cohen, S., Kessler, R. C., & Gordon, L. U. (1995). Strategies for measuring stress in studies of psychiatric and physical disorders. In S. Cohen, R. C. Kessler, & L. U. Gordon (Eds.), *Measuring Stress: A Guide for Health and Social Scientists*

- (pp. 3-26). New York, NY, US: Oxford University Press.
- Colgan, D. D., Wahbeh, H., Pleet, M., Besler, K., & Christopher, M. (2017). A Qualitative Study of Mindfulness Among Veterans With Posttraumatic Stress Disorder: Practices Differentially Affect Symptoms, Aspects of Well-Being, and Potential Mechanisms of Action. *Journal of Evidence-Based Complementary & Alternative Medicine*, 22(3), 482-493. doi: 10.1177/2156587216684999
- Colombo, D., & Perego, R. (2014). Quality of Life in Psoriasis *Psoriasis - Types, Causes, and Medication*. Croatia: InTech. Retrieved from: <http://www.intechopen.com/books/psoriasis-types-causes-and-medication>
- Compton, R. J. (2000). Ability to disengage attention predicts negative affect. *Cognition & Emotion*, 14(3), 401-415. doi: 10.1080/026999300378897
- Connor, C., Liu, V., & Fiedorowicz, J. (2015). Exploring the Physiological Link between Psoriasis and Mood Disorders. *Dermatology Research and Practice*, 68(9), 57-68.
- Costa, J., & Pinto-Gouveia, J. (2011). Acceptance of pain, self-compassion and psychopathology: Using the Chronic Pain Acceptance Questionnaire to identify patients' subgroups. *Clinical Psychology & Psychotherapy*, 18(4), 292-302. doi: 10.1002/cpp.718
- Coumbe, A. G., Pritzker, M. R., & Duprez, D. A. (2014). Cardiovascular risk and psoriasis: beyond the traditional risk factors. *The American Journal of Medicine*, 127(1), 12-18. doi: 10.1016/j.amjmed.2013.08.013
- Crane, C., Crane, R. S., Eames, C., Fennell, M. J. V., Silverton, S., Williams, J. M. G., & Barnhofer, T. (2014). The effects of amount of home meditation practice in Mindfulness Based Cognitive Therapy on hazard of relapse to depression in

- the Staying Well after Depression Trial. *Behaviour Research and Therapy*, 63, 17–24. doi:10.1016/j.brat.2014.08.015
- Craske, M. G. (2010). *Theories of Psychotherapy. Cognitive-behavioral Therapy*. Washington, DC, US: American Psychological Association.
- Creswell, J. D. (2015). Biological pathways linking mindfulness with health. In K. W. Brown, J.D. Creswell & R.M. Ryan, (Eds.), *Handbook of Mindfulness: Theory, Research and Practice* (pp. 426-446). New York, NY, US: Guilford Press.
- Creswell, J. W., & Plano Clark, V. L. (2011). *Choosing a Mixed Methods Design. Designing and Conducting Mixed Methods Research*. Sage Publications.
- Crowley, S. L., & Fan, X. (1997). Structural equation modeling: Basic concepts and applications in personality assessment research. *Journal of Personality Assessment*, 68(3), 508-531. doi: 10.1207/s15327752jpa6803\_4
- Dalai, L., & Cutler, H. C. (1998). *The Art of Happiness*. New York: Riverhead Hardcover.
- D’Alton, P., Kinsella, L., Walsh, O., Sweeney, C., Timoney, I., Lynch, M., ... & Kirby, B. (2018). Mindfulness-Based Interventions for Psoriasis: a Randomized Controlled Trial. *Mindfulness*, 1-13. doi: 10.1007/s12671-018-0973-5
- Davidson, R. J., & Kaszniak, A. W. (2015). Conceptual and methodological issues in research on mindfulness and meditation. *American Psychologist*, 70(7), 581-592. Retrieved from: <http://psycnet.apa.org/buy/2015-45553-001>
- Davies, M. I., & Clark, D. M. (1998). Thought suppression produces a rebound effect with analogue post-traumatic intrusions. *Behaviour Research and Therapy*, 36(6), 571-582. doi: 10.1016/S0005-7967(98)00051-5

- Deisinger, J. A., Cassisi, J. E., & Whitaker, S. L. (1996). Relationships between coping style and PAI profiles in a community sample. *Journal of Clinical Psychology, 52*(3), 303-310. doi: 10.1002/(SICI)10974679(199605)52:3<303::AID-JCLP7>3.0.CO;2-S
- De Korte, J., Mommers, F. M., Bos, J. D., & Sprangers, M. A. (2004, March). Quality of life in patients with psoriasis: a systematic literature review. In *Journal of Investigative Dermatology Symposium Proceedings* (Vol. 9, No. 2, pp. 140-147). Elsevier. doi: 10.1046/j.1087-0024.2003.09110.x
- De Raedt, R., Baert, S., Demeyer, I., Goeleven, E., Raes, A., Visser, A., ... & Speckens, A. (2012). Changes in attentional processing of emotional information following mindfulness-based cognitive therapy in people with a history of depression: Towards an open attention for all emotional experiences. *Cognitive Therapy and Research, 36*(6), 612-620. doi: 10.1007/s10608-011-9411-x
- De Silva, P., & Rachman, S. (1984). Does escape behaviour strengthen agoraphobic avoidance? A preliminary study. *Behaviour Research and Therapy, 22*(1), 87-91. doi: 10.1016/0005-7967(84)90038-X
- De Silva, P. (1990). Buddhist psychology: A review of theory and practice. *Current Psychology, 9*(3), 236-254. doi: 0.1007/BF02686862
- Derogatis, L. R., & Melisaratos, N. (1983). The brief symptom inventory: an introductory report. *Psychological Medicine, 13*(3), 595-605. doi: 10.1017/S0033291700048017
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71-75. Doi: 10.1207/s15327752jpa4901\_13

- Dodge, R., Daly, A. P., Huyton, J., & Sanders, L. D. (2012). The challenge of defining wellbeing. *International Journal of Wellbeing*, 2(3). doi: 10.5502/ijw.v2i3.4
- Dubertret, L., Mrowietz, U., Ranki, A., Van De Kerkhof, P. C. M., Chimenti, S., Lotti, T., ... & EUROPSO patient survey. (2006). European patient perspectives on the impact of psoriasis: the EUROPSO patient membership survey. *British Journal of Dermatology*, 155(4), 729-736. doi:10.1111/j.1365-2133.2006.07405.x
- Edwards, R. T., Bryning, L., & Crane, R. (2015). Design of economic evaluations of mindfulness-based interventions: ten methodological questions of which to be mindful. *Mindfulness*, 6(3), 490-500. doi: 10.1007/s12671-014-0282-6
- Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schönfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy and Experimental Psychiatry*, 42(2), 225-232. doi: 10.1016/j.jbtep.2010.12.003
- Eisendrath, S. J., Gillung, E., Delucchi, K. L., Segal, Z. V., Nelson, J. C., McInnes, L. A., ... Feldman, M. D. (2016). A Randomized Controlled Trial of Mindfulness-Based Cognitive Therapy for Treatment-Resistant Depression. *Journal of Psychotherapy and Psychosomatics*, 85(2), 99–110. doi: 10.1159/000442260
- Ellenbogen, M. A., Schwartzman, A. E., Stewart, J., & Walker, C. D. (2006). Automatic and effortful emotional information processing regulates different aspects of the stress response. *Psychoneuroendocrinology*, 31(3), 373-387. doi: 10.1016/j.psyneuen.2005.09.001



- Ercikan, K., & Roth, W. M. (2006). What good is polarizing research into qualitative and quantitative? *Educational Researcher*, 35(5), 14-23. doi: 10.3102/0013189X035005014
- Ersser, S. J., Surridge, H., & Wiles, A. (2002). What criteria do patients use when judging the effectiveness of psoriasis management? *Journal of Evaluation in Clinical Practice*, 8(4), 367-376. doi:10.1046/j.1365-2753.2002.00372.x
- Farber, E. M., & Nall, L. (1974). The natural history of psoriasis in 5,600 patients. *Dermatology*, 148(1), 1-18. doi: 10.1159/000251595
- Farias, M., & Wikholm, C. (2016). Has the science of mindfulness lost its mind? *BJPsych Bulletin*, 40(6), 329-332. doi: 10.1192/pb.bp.116.053686
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2014). G\* Power. [Software].
- Feldman, S. R., Fleischer Jr, A. B., Reboussin, D. M., Rapp, S. R., Exum, M. L., Clark, A. R., & Nurre, L. (1996). The self-administered psoriasis area and severity index is valid and reliable. *Journal of Investigative Dermatology*, 106(1). doi: 10.1111/1523-1747.ep12329912
- Feldman, C., & Kuyken, W. (2011). Compassion in the landscape of suffering. *Contemporary Buddhism*, 12(01), 143-155. doi:10.1080/14639947.2011.564831
- Feldner, M. T., Zvolensky, M. J., Eifert, G. H., & Spira, A. P. (2003). Emotional avoidance: An experimental test of individual differences and response suppression using biological challenge. *Behaviour Research and Therapy*, 41(4), 403-411. doi: 10.1016/S0005-7967(02)00020-7
- Fennell, M., & Segal, Z. (2011). Mindfulness-based cognitive therapy: culture clash or creative fusion? *Contemporary Buddhism*, 12(01), 125-142. doi: 10.1080/14639947.2011.564828

- Fitzmaurice, G. M., Laird, N. M., & Ware, J. H. (2011). *Applied Longitudinal Analysis*. Hoboken: Wiley.
- Fjorback, L. O., Arendt, M., Ørnbøl, E., Fink, P., & Walach, H. (2011). Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy—a systematic review of randomized controlled trials. *Acta Psychiatrica Scandinavica*, *124*(2), 102-119. doi: 10.1111/j.1600-0447.2011.01704
- Fledderus, M., Bohlmeijer, E. T., Smit, F., & Westerhof, G. J. (2010). Mental health promotion as a new goal in public mental health care: A randomized controlled trial of an intervention enhancing psychological flexibility. *American Journal of Public Health*, *100*(12), 2372-2372. doi: 10.2105/AJPH.2010.196196
- Fleischer, R. (1996). R. Fleischer, *Phys. Lett. B* *365*, 399 (1996). *Phys. Lett. B*, *365*, 399.
- Fletcher, L., Hayes, S. C. (2005). Relational frame theory, acceptance and commitment therapy, and a functional analytic definition of mindfulness. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, *23*(4), 315-336. doi: 10.1007/s10942-005-0017-7
- Fleming, P., Bai, J. W., Pratt, M., Sibbald, C., Lynde, C., & Gulliver, W. P. (2017). The prevalence of anxiety in patients with psoriasis: a systematic review of observational studies and clinical trials. *Journal of the European Academy of Dermatology and Venereology*, *31*(5), 798-807. doi: 10.1111/jdv.13891
- Folkman, S., & Moskowitz, J. T. (2000). Positive affect and the other side of coping. *American Psychologist*, *55*(6), 647. doi: 10.1037/0003-066X.55.6.647

- Fontaine, K. R., Manstead, A. S., & Wagner, H. (1993). Optimism, perceived control over stress, and coping. *European Journal of Personality*, 7(4), 267-281. doi: 10.1002/per.2410070407
- Fordham, B., Griffiths, C. E., & Bundy, C. (2013). Can stress reduction interventions improve psoriasis? A review. *Psychology, Health & Medicine*, 18(5), 501-514. doi: 10.1080/13548506.2012.736625
- Fordham, B., Griffiths, C. E. M., & Bundy, C. (2015). A pilot study examining mindfulness-based cognitive therapy in psoriasis. *Psychology, Health & Medicine*, 20(1), 121-127. doi: 10.1080/13548506.2014.902483
- Fordham, B. A., Nelson, P., Griffiths, C. E. M., & Bundy, C. (2015). The acceptability and usefulness of mindfulness-based cognitive therapy for people living with psoriasis: a qualitative study. *British Journal of Dermatology*, 172(3), 823-825. doi: 10.1111/bjd.13333
- Fortune, D. G., Main, C. J., O'Sullivan, T. M., & Griffiths, C. E. (1997). Assessing illness-related stress in psoriasis: the psychometric properties of the Psoriasis Life Stress Inventory. *Journal of Psychosomatic Research*, 42(5), 467-475. doi: 10.1016/S0022-3999(97)00036-6
- Fortune, D. G., Richards, H. L., Corrin, A., Taylor, R. J., Griffiths, C. E., & Main, C. J. (2002). Attentional bias for psoriasis-specific and psychosocial threat in patients with psoriasis. *Journal of Behavioral Medicine*, 26(3), 211-224. doi: 10.1023/A:1023408503807
- Fortune, D. G., Richards, H. L., Corrin, A., Taylor, R. J., Griffiths, C. E., & Main, C. J. (2003). Attentional bias for psoriasis-specific and psychosocial threat in patients with psoriasis. *Journal of Behavioral Medicine*, 26(3), 211-224. doi: 10.1023/A:1023408503807

- Fortune, D. G., Richards, H. L., Kirby, B., McElhone, K., Main, C. J., & Griffiths, C. E. M. (2004). Successful treatment of psoriasis improves psoriasis-specific but not more general aspects of patients' well-being. *British Journal of Dermatology, 151*(6), 1219-1226. doi:10.1111/j.1365-2133.2004.06222.x
- Fowler, J. F., Duh, M. S., Rovba, L., Buteau, S., Pinheiro, L., Lobo, F., ... & Kosicki, G. (2008). The impact of psoriasis on health care costs and patient work loss. *Journal of the American Academy of Dermatology, 59*(5), 772-780. doi: 10.1016/j.jaad.2008.06.043
- Freeman, D., & Freeman, J. (2015, April). New study shows mindfulness therapy can be as effective as antidepressants. *Guardian*. Retrieved from <https://www.theguardian.com/science/blog/2015/apr/21/could-mindfulness-therapy-be-an-alternative-to-antidepressants>
- Fresco, D. M., Frankel, A. N., Mennin, D. S., Turk, C. L., & Heimberg, R. G. (2002). Distinct and overlapping features of rumination and worry: The relationship of cognitive production to negative affective states. *Cognitive Therapy and Research, 26*(2), 179-188. doi: 10.1023/A:1014517718949
- Fresco, D. M., Moore, M. T., van Dulmen, M. H., Segal, Z. V., Ma, S. H., Teasdale, J. D., & Williams, J. M. G. (2007). Initial psychometric properties of the experiences questionnaire: validation of a self-report measure of decentering. *Behavior Therapy, 38*(3), 234-246. doi: 10.1016/j.beth.2006.08.003
- Fritz, M. S., MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18*(3), 233-239. doi: 10.1111/j.1467-9280.2007.01882.x

- Fu, Y., Lee, C., & Chi., C. (2018). Association of Psoriasis With Inflammatory Bowel Disease: A Systematic Review and Meta-analysis. *JAMA Dermatology*, *154*(12), 1417–1423. doi:10.1001/jamadermatol.2018.3631
- Furr, R. M. (2018). *Psychometrics: An Introduction* (3rd ed.). Thousand Oaks, CA: SAGE Publications.
- Fung, K. (2015). Acceptance and commitment therapy: Western adoption of Buddhist tenets?. *Transcultural Psychiatry*, *52*(4), 561-576. doi: 10.1177/1363461514537544
- Garland, E. L., Farb, N. A., R. Goldin, P., & Fredrickson, B. L. (2015). Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological Inquiry*, *26*(4), 293-314. doi: 10.1080/1047840X.2015.1064294
- Gecht, J., Kessel, R., Forkmann, T., Gauggel, S., Druke, B., Scherer, A., & Mainz, V. (2014). A mediation model of mindfulness and decentering: sequential psychological constructs or one and the same?. *BMC Psychology*, *2*(1), 18. doi: 10.1186/2050-7283-2-18
- Gelfand, J. M., Neimann, A. L., Shin, D. B., Wang, X., Margolis, D. J., & Troxel, A. B. (2006). Risk of myocardial infarction in patients with psoriasis. *Jama*, *296*(14), 1735-1741. doi: 10.1016/j.jaad.2006.08.040
- Geschwind, N., Peeters, F., Huibers, M., van Os, J., & Wichers, M. (2012). Efficacy of mindfulness-based cognitive therapy in relation to prior history of depression: randomised controlled trial. *The British Journal of Psychiatry*, *201*(4), 320-325. doi: 10.1192/bjp.bp.111.104851
- Gethin, R. (2011). On some definitions of mindfulness. *Contemporary Buddhism*, *12*(01), 263-279. doi: 10.1080/14639947.2011.564843

- Gilpin, R. (2008). The use of Theravāda Buddhist practices and perspectives in mindfulness-based cognitive therapy. *Contemporary Buddhism*, 9(2), 227-251. doi: 10.1080/14639940802556560
- Giorgio, J. M., Sanflippo, J., Kleiman, E., Reilly, D., Bender, R. E., Wagner, C. A., & Alloy, L. B. (2010). An experiential avoidance conceptualization of depressive rumination: Three tests of the model. *Behaviour Research and Therapy*, 48(10), 1021-1031. doi: 10.1016/j.brat.2010.07.004
- Golderberg, D., & Williams, P. (1988). A user's guide to the General Health Questionnaire. Windsor, UK: NFER-Nelson.
- Goldin, P. R., Morrison, A., Jazaieri, H., Brozovich, F., Heimberg, R., & Gross, J. J. (2016). Group CBT versus MBSR for social anxiety disorder: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 84(5), 427. doi: 10.31231/osf.io/3pxzd
- Goyal, M., Singh, S., Sibinga, E. M., Gould, N. F., Rowland-Seymour, A., Sharma, R., ... & Ranasinghe, P. D. (2014). Meditation programs for psychological stress and well-being: a systematic review and meta-analysis. *JAMA Internal Medicine*, 174(3), 357-368. doi:10.1001/jamainternmed.2013.13018
- Grabovac, A., Lau, M. & Willett, B. (2011) 'Mechanisms of Mindfulness: A Buddhist Psychological Model', *Mindfulness*, 2 (3): 154-166. doi: 10.1007/s12671-011-0054-5
- Grabovac, A. D., Lau, M. A., & Willett, B. R. (2011). Mechanisms of mindfulness: A Buddhist psychological model. *Mindfulness*, 2(3), 154-166. doi: 10.1007/s12671-011-0054-5

- Griffiths, C. E. M., & Richards, H. L. (2001). Psychological influences in psoriasis. *Clinical and Experimental Dermatology*, 26(4), 338-342. doi: 10.1046/j.1365-2230.2001.00834.x
- Griffiths, C. E., & Barker, J. N. (2007). Pathogenesis and clinical features of psoriasis. *The Lancet*, 370(9583), 263-271. doi: 10.1016/S0140-6736(07)61128-3
- Gross, J. J., & Muñoz, R. F. (1995). Emotion regulation and mental health. *Clinical psychology: Science and Practice*, 2(2), 151-164. doi:10.1111/j.1468-2850.1995.tb00036.x
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, 39, 281–291. doi: 10.1017/S0048577201393198
- Gross, J. J., & Thompson, R. A. (2007). Emotion Regulation: Conceptual Foundations. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 3-24). New York: Guilford Press.
- Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research*, 57(1), 35-43. doi: 10.1016/S0022-3999(03)00573-7
- Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research*, 64(4), 405-408. doi: 10.1016/j.jpsychores.2008.02.001
- Grossman, P. (2010). Mindfulness for psychologists: Paying kind attention to the perceptible. *Mindfulness*, 1(2), 87-97. doi:10.1007/s12671-010-0012-7
- Grossman, P. (2011). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's

- (re) invention of mindfulness: Comment on Brown (2011). doi:  
10.1037/a0022713.
- Grossman, P., & Van Dam, N. T. (2011). Mindfulness, by any other name...: trials and tribulations of sati in western psychology and science. *Contemporary Buddhism, 12*(01), 219-239. doi: 10.1080/14639947.2011.564841
- Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review, 37*, 1-12. doi: 10.1016/j.cpr.2015.01.006
- Gunaratana, H. (2002). *Mindfulness in Plain English*. Boston, MA: Wisdom Publications.
- Gunderson, G. (2016, June 28). The science is in, and meditation may be the next big business opportunity. *Forbes*. Retrieved from <http://www.forbes.com/sites/garrett-gunderson/2016/06/28/the-science-is-in-and-meditation-may-be-the-next-big-business-opportunity/#2f729c7123c0>
- Gunnarsson, C., Chen, J., Rizzo, J. A., Ladapo, J. A., Naim, A., & Lofland, J. H. (2012). The direct healthcare insurer and out-of-pocket expenditures of psoriasis: evidence from a United States national survey. *Journal of Dermatological Treatment, 23*(4), 240-254. doi:  
10.3109/09546634.2010.550911
- Gupta, M. A., & Gupta, A. K. (1995). The Psoriasis Life Stress Inventory: a preliminary index of psoriasis. *Acta Derm Venereol (Stockh), 75*, 240-243. doi: 10.2340/0001555575240243
- Gupta, M. A., & Gupta, A. K. (1998). Depression and suicidal ideation in dermatology patients with acne, alopecia areata, atopic dermatitis and



- psoriasis. *The British Journal of Dermatology*, 139(5), 846-850. doi: 10.1046/j.1365-2133.1998.02511.x
- Gupta, S. K. (2011). Intention-to-treat concept: A review. *Perspectives in Clinical Research*, 2(3), 109–112. doi: 10.4103/2229-3485.83221
- Hamilton, M. (1960). A Rating Scale for Depression. *Journal of Neurology, Neurosurgery, and Psychiatry*, 23(1), 56-62. doi: 10.1136/jnnp.23.1.56
- Hanh, T. N. (1999). *The Heart of the Buddha's Teaching: Transforming Suffering into Peace, Joy & Liberation: The Four Noble Truths, the Noble Eightfold Path, and Other Basic Buddhist Teachings*. Random House.
- Hargus, E., Crane, C., Barnhofer, T., & Williams, J. M. G. (2010). Effects of mindfulness on meta-awareness and specificity of describing prodromal symptoms in suicidal depression. *Emotion*, 10(1), 34-42. doi:10.1037/a0016825.
- Harrington, R., & Loffredo, D. A. (2010). Insight, rumination, and self-reflection as predictors of well-being. *The Journal of Psychology*, 145(1), 39-57. doi:0.1080/00223980.2010.528072
- Hawro, T., Maurer, M., Hawro, M., Kaszuba, A., Cierpiałkowska, L., Królikowska, M., & Zalewska, A. (2015). In psoriasis, levels of hope and quality of life are linked. *Archives of Dermatological Research*, 306(7), 661-666. doi: 10.1007/s00403-014-1455-9
- Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice*, 11, 255–262. doi: 10.1093/clipsy.bph080.
- Hayes, A. F. (2014). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. Retrieved from

<https://www.guilford.com/books/Introduction-to-Mediation-Moderation-and-Conditional-Process-Analysis/Andrew-Hayes/9781462534654>

- Hayes, J. & J. Koo (2010) 'Psoriasis: depression, anxiety, smoking, and drinking habits' *Dermatology Therapy*, 23(2): 174-180. doi: 10.1111/j.1529-8019.2010.01312.x
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, 64(6), 1152. doi: 10.1037/0022-006X.64.6.1152
- Hayes, S. C., & Wilson, K. G. (2003). Mindfulness: Method and process. *Clinical Psychology: Science and Practice*, 10(2), 161-165. doi: 10.1093/clipsy/bpg018
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44(1), 1-25. doi: 10.1016/j.brat.2005.06.006
- Hayes, S. C., Levin, M. E., Plumb-Villardaga, J., Villatte, J. L., & Pistorello, J. (2013). Acceptance and commitment therapy and contextual behavioral science: Examining the progress of a distinctive model of behavioral and cognitive therapy. *Behavior Therapy*, 44(2), 180-198. doi: 10.1016/j.beth.2009.08.002
- Hayes-Skelton, S.A., Wadsworth L.P. (2015) Mindfulness in the Treatment of Anxiety. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook of Mindfulness: Theory, Research, and Practice* (pp. 367-386). New York, NY, US: Guilford Press.
- Henderson, M., & Page, L. (2007). Appraising the evidence: what is selection bias?. *Evidence-Based Mental Health*, 10(3), 67. doi: 10.1136/ebmh.10.3.67

- Heppner, W. L., Spears, C. A., Correa-Fernández, V., Castro, Y., Li, Y., Guo, B., ...  
Wetter, D. W. (2016). Dispositional Mindfulness Predicts Enhanced Smoking  
Cessation and Smoking Lapse Recovery. *Annals of Behavioral Medicine : A  
Publication of the Society of Behavioral Medicine*, 50(3), 337–347.  
doi:10.1007/s12160-015-9759-3
- Higgins, J. P., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., Oxman, A. D., ...  
& Sterne, J. A. (2011). The Cochrane Collaboration's tool for assessing risk of  
bias in randomised trials. *BMJ*, 343, d5928. doi: 10.1136/bmj.d5928
- Hill, L., & Kennedy, P. (2002). The role of coping strategies in mediating subjective  
disability in people who have psoriasis. *Psychology, Health & Medicine*, 7(3),  
261-269. doi: 10.1080/13548500220139340
- Hilt, L. M., McLaughlin, K. A., & Nolen-Hoeksema, S. (2010). Examination of the  
response styles theory in a community sample of young adolescents. *Journal  
of Abnormal Child Psychology*, 38(4), 545-556. doi: 10.1007/s10802-009-  
9384-3
- Hofmann, S. G., Sawyer, A. T., & Fang, A. (2010). The empirical status of the “new  
wave” of cognitive behavioral therapy. *Psychiatric Clinics*, 33(3), 701-710.  
doi: 10.1016/j.psc.2010.04.006
- Hofmann, S. G., & Asmundson, G. J. (2008). Acceptance and mindfulness-based  
therapy: New wave or old hat?. *Clinical Psychology Review*, 28(1), 1-16. doi:  
10.1016/j.cpr.2007.09.003
- Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of  
mindfulness-based therapy on anxiety and depression: A meta-analytic  
review. *Journal of Consulting and Clinical Psychology*, 78(2), 169. doi:  
10.1037/a0018555

- Hofmann, S. G., Asnaani, A., Vonk, I. J. J., Sawyer, A. T., & Fang, A. (2012). The Efficacy of Cognitive Behavioral Therapy: A Review of Meta-analyses. *Cognitive Therapy and Research*, *36*(5), 427–440. doi: 10.1007/s10608-012-9476-1
- Hoge, E. A., Bui, E., Goetter, E., Robinaugh, D. J., Ojserkis, R. A., Fresco, D. M., & Simon, N. M. (2015). Change in decentering mediates improvement in anxiety in mindfulness-based stress reduction for generalized anxiety disorder. *Cognitive Therapy and Research*, *39*(2), 228-235. doi: 10.1007/s10608-014-9646-4
- Holahan, C. J., & Moos, R. H. (1990). Life stressors, resistance factors, and improved psychological functioning: An extension of the stress resistance paradigm. *Journal of Personality and Social Psychology*, *58*(5), 909. doi: 10.1037//0022-3514.58.5.909
- Holahan, C. J., & Moos, R. H. (1991). Life stressors, personal and social resources, and depression: A 4-year structural model. *Journal of Abnormal Psychology*, *100*(1), 31. doi: 10.1037/0021-843X.100.1.31
- Holahan, C. J., Moos, R. H., & Schaefer, J. A. (1996). Coping, stress resistance, and growth: Conceptualizing adaptive functioning. In M. Zeidner & N. S. Endler (Eds.), *Handbook of Coping: Theory, Research, Applications* (pp. 24-43). Oxford, England: John Wiley & Sons.
- Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science*, *6*(6), 537-559. doi: 10.1177/1745691611419671

- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods*, 6(1), 53-60. Retrieved from [https://arrow.dit.ie/cgi/viewcontent.cgi?referer=https://scholar.google.com/scholar?cluster=11437753260490036189&hl=en&as\\_sdt=0,5&httpsredir=1&article=1001&context=buschmanart](https://arrow.dit.ie/cgi/viewcontent.cgi?referer=https://scholar.google.com/scholar?cluster=11437753260490036189&hl=en&as_sdt=0,5&httpsredir=1&article=1001&context=buschmanart)
- Hong, R. Y. (2007). Worry and rumination: Differential associations with anxious and depressive symptoms and coping behavior. *Behaviour Research and Therapy*, 45(2), 277-290. doi: 10.1016/j.brat.2006.03.006
- Horn, E. J., Fox, K. M., Patel, V., Chiou, C. F., Dann, F., & Lebwohl, M. (2007). Association of patient-reported psoriasis severity with income and employment. *Journal of the American Academy of Dermatology*, 57(6), 963-971. doi: 10.1016/j.jaad.2007.07.023
- Howells, L., Chisholm, A., Cotterill, S., Chinoy, H., Warren, R. B., & Bundy, C. (2018). Impact of Disease Severity, Illness Beliefs, and Coping Strategies on Outcomes in Psoriatic Arthritis. *Arthritis Care & Research*, 70(2), 295-302. doi: 10.1002/acr.23330
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288. doi: 10.1177/1049732305276687
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55. doi: 10.1080/10705519909540118

- Hugh-Jones, S., Rose, S., Koutsopoulou, G. Z., & Simms-Ellis, R. (2018). How Is Stress Reduced by a Workplace Mindfulness Intervention? A Qualitative Study Conceptualising Experiences of Change. *Mindfulness*, 9(2), 474-487. doi: 10.1007/s12671-017-0790-2
- Irish Network for Mindfulness-Based Teachers. (2015). *The Irish Good Practice Guidelines for Teaching Mindfulness-Based Courses*. Dublin: Ireland. Retrieved from <http://www.mindfulnessteachersnetworkireland.ie/wp-content/uploads/2016/03/Irish-Teacher-Guidelines-April-20-2015-1-1-1.pdf>
- Irish Skin Foundation. (2015). *The Burden of Psoriasis Epidemiology, Quality of Life, Co-morbidities and Treatment Goals*. Galway, Ireland: Novartis & J.E. Cairnes School of Business and Economics. Retrieved from the Irish Skin Foundations website: [https://irishskin.ie/wpcontent/uploads/2016/08/Burden\\_of\\_Psoriasis\\_Report\\_final.pdf](https://irishskin.ie/wpcontent/uploads/2016/08/Burden_of_Psoriasis_Report_final.pdf)
- Jacobson, L., & Sapolsky, R. (1991). The role of the hippocampus in feedback regulation of the hypothalamic-pituitary-adrenocortical axis. *Endocrine Reviews*, 12(2), 118-134.
- Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P. J., Bell, I., & Schwartz, G. E. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: effects on distress, positive states of mind, rumination, and distraction. *Annals of Behavioral Medicine*, 33(1), 11-21. doi: 10.1207/s15324796abm3301\_2
- Janowski, K., & Pietrzak, A. (2008). Indications for psychological intervention in patients with psoriasis. *Dermatologic Therapy*, 21(5), 409-411. doi: 10.1111/j.1529-8019.2008.00223.x

- Javitz, H. S., Ward, M. M., Farber, E., Nail, L., & Vallow, S. G. (2002). The direct cost of care for psoriasis and psoriatic arthritis in the United States. *Journal of the American Academy of Dermatology*, 46(6), 850-860. doi: 10.1067/mjd.2002.119669
- Jobling, R., & Naldi, L. (2006). Assessing the impact of psoriasis and the relevance of qualitative research. *Journal of Investigative Dermatology*, 126(7), 1438-1440. doi: 10.1038/sj.jid.5700223
- Jöreskog, K. G. (1971). Statistical analysis of sets of congeneric tests. *Psychometrika*, 36(2), 109-133. doi: 10.1007/BF02291393
- Joreskog K, Sorbom D. (2009). LISREL (Version 9.3). Chicago: Scientific Software: Inc.
- Judd, C. M., & Kenny, D. A. (1981). Process analysis: Estimating mediation in treatment evaluations. *Evaluation Review*, 5(5), 602-619. doi: 10.1177/0193841X8100500502
- Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry*, 4(1), 33-47. doi: 10.1016/0163-8343(82)90026-3
- Kabat-Zinn J. (1990) *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress Pain and Illness*. New York: Delacorte.
- Kabat-Zinn J. (1994) *Wherever You Go There You Are: Mindfulness Meditation in Everyday Life*. New York: Hyperion.
- Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., ... & Bernhard, J. D. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to

- severe psoriasis undergoing photo therapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine*, 60(5), 625-632. Retrieved from <https://insights.ovid.com/pubmed?pmid=9773769>
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice*, 10, 144–156. doi: 10.1093/clipsy/bpg016
- Kabat-Zinn, J. (2013). *Full Catastrophe Living, Revised Edition: How to Cope with Stress, Pain and Illness Using Mindfulness Meditation*. Hachette UK.
- Kang, C., & Whittingham, K. (2010). Mindfulness: A dialogue between Buddhism and clinical psychology. *Mindfulness*, 1(3), 161-173. doi: 10.1007/s12671-010-0018-1
- Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology*, 3, 1–27. doi: 10.1146/annurev.clinpsy.3.022806.091432.
- Kelly-Sell, M., & Gudjonsson, J. E. (2017). Overview of psoriasis. In J. Wu, S. Feldman, & M. Lebwohl (Eds.), *Therapy for severe psoriasis* (pp. 1–16). Philadelphia: Elsevier.
- Kechter, A., Amaro, H., & Black, D. S. (2018). Reporting of Treatment Fidelity in Mindfulness-Based Intervention Trials: A Review and New Tool Using NIH Behavior Change Consortium Guidelines. *Mindfulness*, 1-19. doi: 10.1007/s12671-018-0974-4
- Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review*, 31(6), 1041-1056. doi: 10.1016/j.cpr.2011.04.006
- Kenny, M. A., & Williams, J. M. G. (2007). Treatment-resistant depressed patients



- show a good response to mindfulness-based cognitive therapy. *Behaviour Research and Therapy*, 45(3), 617-625. doi: 10.1016/j.brat.2006.04.008
- Keyworth, C., Nelson, P., Chisholm, A., Griffiths, C., Cordingly, L. & C. Bundy (2014) 'Providing lifestyle behaviour change support for patients with psoriasis: an assessment of the existing training competencies across medical and nursing health professionals' *British Journal of Dermatology*, 171(3): 602-608. doi: 10.1111/bjd.13067
- Kimball, A. B., Jacobson, C., Weiss, S., Vreeland, M. G., & Wu, Y. (2005). The psychosocial burden of psoriasis. *American Journal of Clinical Dermatology*, 6(6), 383-392. doi: 10.2165/00128071-200506060-00005
- Kimball, A. B., Gladman, D., Gelfand, J. M., Gordon, K., Horn, E. J., Korman, N. J., ... & Lebwohl, M. G. (2008). National Psoriasis Foundation clinical consensus on psoriasis comorbidities and recommendations for screening. *Journal of the American Academy of Dermatology*, 58(6), 1031-1042. doi: 10.1016/j.jaad.2008.01.006
- Kimball, A. B., Gieler, U., Linder, D., Sampogna, F., Warren, R. B., & Augustin, M. (2010). Psoriasis: is the impairment to a patient's life cumulative? *Journal of the European Academy of Dermatology and Venereology*, 24(9), 989-1004. doi: 10.1111/j.1468-3083.2010.03705.x
- Kimball, A. B., Guerin, A., Tsaneva, M., Yu, A. P., Wu, E. Q., Gupta, S. R., ... & Mulani, P. M. (2011). Economic burden of comorbidities in patients with psoriasis is substantial. *Journal of the European Academy of Dermatology and Venereology*, 25(2), 157-163. doi: 10.1111/j.1468-3083.2010.03730.x
- Kircanski, K., Joormann, J., & Gotlib, I. H. (2012). Cognitive Aspects of Depression. *Wiley interdisciplinary reviews: Cognitive science*, 3(3), 301-313.

- Kline, R. B. (2005). *Methodology in the Social Sciences. Principles and Practice of Structural Equation Modeling* (2nd ed.). New York, NY, US: Guilford Press.
- Kostyła, M., Tabala, K., & Kocur, J. (2013). Illness acceptance degree versus intensity of psychopathological symptoms in patients with psoriasis. *Advances in Dermatology and Allergology/Postępy Dermatologii I Alergologii*, 30(3), 134. doi: 10.5114/pdia.2013.35613
- Kraemer, H. C., Wilson, G. T., Fairburn, C. G., & Agras, W. S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry*, 59(10), 877-883. doi: 10.1001/archpsyc.59.10.877
- Kreuger, G., Koo, J., Lebwohl, M., Menter, A., Stern, R. S., & Rolstad, T. (2001). The impact of psoriasis on quality of life: results of a 1998 National Psoriasis Foundation patient-membership survey. *Archives of Dermatology*, 137(3), 280-284. doi:10-1001/pubs.Arch Dermatol.-ISSN-0003-987x-137-3-dst0024
- Krieger, T., Altenstein, D., Baettig, I., Doerig, N., & Holtforth, M. G. (2013). Self-compassion in depression: Associations with depressive symptoms, rumination, and avoidance in depressed outpatients. *Behavior Therapy*, 44(3), 501-513. doi: 10.1016/j.beth.2013.04.004
- Kumar, S. M. (2003). An introduction to Buddhism for the cognitive-behavioral therapist. *Cognitive and Behavioral Practice*, 9(1), 40-43. doi: 10.1016/S1077-7229(02)80038-4
- Kumar, S., Feldman, G., & Hayes, A. (2008). Changes in mindfulness and emotion regulation in an exposure-based cognitive therapy for depression. *Cognitive Therapy and Research*, 32(6), 734. doi: 10.1007/s10608-008-9190-1
- Kurd, S. K., Troxel, A. B., Crits-Christoph, P., & Gelfand, J. M. (2010). The risk of depression, anxiety and suicidality in patients with psoriasis: A population-

- based cohort study. *Archives of Dermatology*, 146(8), 891–895. doi:  
10.1001/archdermatol.2010.186
- Kuyken, W., Byford, S., Taylor, R. S., Watkins, E., Holden, E., White, K., . . .  
Teasdale, J. D. (2008). Mindfulness-based cognitive therapy to prevent relapse  
in recurrent depression. *Journal of Consulting and Clinical Psychology*, 76(6),  
966-978. doi: 10.1037/a0013786.
- Kuyken, W., Watkins, E., Holden, E., White, K., Taylor, R. S., Byford, S., ... &  
Dalgleish, T. (2010). How does mindfulness-based cognitive therapy work?  
*Behaviour Research and Therapy*, 48(11), 1105-1112. doi:  
10.1016/j.brat.2010.08.003
- Kvillemo, P., & Bränström, R. (2011). Experiences of a mindfulness-based stress-  
reduction intervention among patients with cancer. *Cancer Nursing*, 34(1), 24-  
31. doi: 10.1097/NCC.0b013e3181e2d0df
- Labelle, L. E., Campbell, T. S., & Carlson, L. E. (2010). Mindfulness-based stress  
reduction in oncology: Evaluating mindfulness and rumination as mediators of  
change in depressive symptoms. *Mindfulness*, 1(1), 28-40. doi:  
10.1007/s12671-010-0005-6
- Langley, R. G. B., Krueger, G. G., & Griffiths, C. E. M. (2005). Psoriasis:  
epidemiology, clinical features, and quality of life. *Annals of the Rheumatic  
Diseases*, 64(suppl 2), ii18-ii23. doi: 10.1136/ard.2004.033217
- Lau, M. A., Segal, Z. V., & Williams, J. M. G. (2004). Teasdale's differential  
activation hypothesis: implications for mechanisms of depressive relapse and  
suicidal behaviour. *Behaviour Research and Therapy*, 42(9), 1001-1017. doi:  
10.1016/j.brat.2004.03.003

- Lau, W. K., Leung, M. K., Wing, Y. K., & Lee, T. M. (2018). Potential Mechanisms of Mindfulness in Improving Sleep and Distress. *Mindfulness*, *9*(2), 547-555. doi: 10.1007/s12671-017-0796-9
- Lavda, A. C., Webb, T. L., & Thompson, A. R. (2012). A meta-analysis of the effectiveness of psychological interventions for adults with skin conditions. *British Journal of Dermatology*, *167*(5), 970-979.
- Lazarus, R.S. (1966). Psychological stress and the coping process. New York, NY, US: McGraw-Hill.
- Lazarus, R. S., & Folkman, S. (1984). Coping and adaptation. *The Handbook of Behavioral Medicine*, 282-325.
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.
- Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology*, *44*(1), 1-22. doi: 10.1146/annurev.ps.44.020193.000245
- Lazarus, R. S. (1999). *Stress and Emotion: A New Synthesis*. New York, NY: Springer.
- Leary, M. R., Tate, E. B., Adams, C. E., Batts Allen, A., & Hancock, J. (2007). Self-compassion and reactions to unpleasant self-relevant events: the implications of treating oneself kindly. *Journal of Personality and Social Psychology*, *92*(5), 887. doi: 10.1037/0022-3514.92.5.887
- Lebois, L. A., Papias, E. K., Gopinath, K., Cabanban, R., Quigley, K. S., Krishnamurthy, V., ... & Barsalou, L. W. (2015). A shift in perspective: Decentering through mindful attention to imagined stressful

- events. *Neuropsychologia*, 75, 505-524. doi:  
10.1016/j.neuropsychologia.2015.05.030
- Leeuw, M., Goossens, M. E. J. B., De Vet, H. C. W., & Vlaeyen, J. W. S. (2009). The fidelity of treatment delivery can be assessed in treatment outcome studies: a successful illustration from behavioral medicine. *Journal of Clinical Epidemiology*, 62(1), 81-90.
- Leventhal, H., Diefenbach, M., & Leventhal, E. A. (1992). Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognitive Therapy and Research*, 16(2), 143-163. doi:  
10.1007/BF01173486
- Levitt, J. T., Brown, T. A., Orsillo, S. M., & Barlow, D. H. (2004). The effects of acceptance versus suppression of emotion on subjective and psychophysiological response to carbon dioxide challenge in patients with panic disorder. *Behavior Therapy*, 35(4), 747-766. doi: 10.1016/S0005-7894(04)80018-2
- Lewis, G., & Wessely, S. (1990). Comparison of the general health questionnaire and the hospital anxiety and depression scale. *The British Journal of Psychiatry*, 157(6), 860-864. doi: 10.1192/bjp.157.6.860
- Linehan, M. (1993). *Cognitive-Behavioral Treatment of Borderline Personality Disorder*. New York: Guilford press.
- Ljosaa, T. M., Mork, C., Stubhaug, A., Moum, T., & Wahl, A. K. (2012). Skin pain and skin discomfort is associated with quality of life in patients with psoriasis. *Journal of the European Academy of Dermatology and Venereology*, 26(1), 29-35. doi: 10.1111/j.1468-3083.2011.04000.x

- Lloyd, T., & Hastings, R. P. (2008). Psychological variables as correlates of adjustment in mothers of children with intellectual disabilities: Cross-sectional and longitudinal relationships. *Journal of Intellectual Disability Research, 52*(1), 37-48. doi: 10.1111/j.1365-2788.2007.00974.x
- Ludwig, D. S., & Kabat-Zinn, J. (2008). Mindfulness in medicine. *Jama, 300*(11), 1350-1352. doi: 10.1001/jama.300.11.1350
- Lyubomirsky, S., & Nolen-Hoeksema, S. (1995). Effects of self-focused rumination on negative thinking and interpersonal problem solving. *Journal of Personality and Social Psychology, 69*(1), 176. doi: 10.1037/0022-3514.69.1.176
- Lyubomirsky, S., Tucker, K. L., Caldwell, N. D., & Berg, K. (1999). Why ruminators are poor problem solvers: Clues from the phenomenology of dysphoric rumination. *Journal of Personality and Social Psychology, 77*(5), 1041. doi: 10.1037/0022-3514.77.5.1041
- Lyubomirsky, S., & Tkach, C. (2004). The consequences of dysphoric rumination. In Papageorgiou, C. & Wells. A. (Eds.), *Depressive Rumination: Nature, Theory and Treatment* (pp. 21-41). Chichester, England: John Wiley & Sons.
- Lynch, T. R., Chapman, A. L., Rosenthal, M. Z., Kuo, J. R., Linehan, M. M. (2006). Mechanisms of change in dialectical behavior therapy: Theoretical and empirical observations. *Journal of Clinical Psychology, 62*(4), 459-480. doi: 10.1002/jclp.20243
- Lynch, T. R., Lazarus, S. A., & Cheavens, J. S. (2015). Mindfulness interventions for emotion dysregulation disorders: From self-control to self-regulation. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook on Mindfulness: Theory and Research* (pp. 329-347). New York: Guilford.

- Lyon, B. (2012). Stress, Coping, and Health: A conceptual Overview (Update). In Rice, V. H. (Ed.). (2012). *Handbook of Stress, Coping, and Health: Implications for Nursing Research, Theory, and Practice*. (pp.1-19). Sage Publications.
- Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-based cognitive therapy for depression: replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology, 72*(1), 31. doi: 10.1037/0022-006X.72.1.31
- MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review, 32*, 545- 552. doi: 10.1016/j.cpr.2012.06.003
- MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology, 51*(1), 201-226. doi: 10.1146/annurev.psych.51.1.201
- Mackenzie, M. J., Carlson, L. E., Munoz, M., & Speca, M. (2007). A qualitative study of self-perceived effects of mindfulness-based stress reduction (MBSR) in a psychosocial oncology setting. *Stress and Health: Journal of the International Society for the Investigation of Stress, 23*(1), 59-69. doi: 10.1002/smi.1120
- Magin, P., Adams, J., Heading, G., Pond, D., & Smith, W. (2009). The psychological sequelae of psoriasis: results of a qualitative study. *Psychology, Health & Medicine, 14*(2), 150-161. doi: 10.1080/13548500802512294
- Malaeb, Z. A., Summers, J. K., & Pugsek, B. H. (2000). Using structural equation modeling to investigate relationships among ecological variables. *Environmental and Ecological Statistics, 7*(1), 93-111. doi: 10.1023/A:1009662930292

- Malinowski, G. (2017). Many-valued logics. *The Blackwell Guide to Philosophical Logic*, 309-335. doi: 10.1002/9781405164801.ch14
- Manicavasgar, V., Parker, G., & Perich, T. (2011). Mindfulness-based cognitive therapy vs cognitive behaviour therapy as a treatment for non-melancholic depression. *Journal of Affective Disorders*, 130(1-2), 138-144. doi: 10.1016/j.jad.2010.09.027
- Martell, C. R., Addis, M. E., & Jacobson, N. S. (2003). Depression in context. Strategies for guided action. *Tijdschrift voor Psychiatrie*, 45, 7. Norton. Retrieved from <http://www.tijdschriftvoorpsychiatrie.nl/issues/6/articles/5025>
- Martin, L. L., & Tesser, A. (1989). Toward a motivational and structural theory of ruminative thought. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended Thought: The Limits of Awareness, Intention, and Control* (pp. 552–572). New York: Guilford.
- Mathieu, J. E., & Taylor, S. R. (2006). Clarifying conditions and decision points for mediational type inferences in organizational behavior. *Journal of Organizational Behavior*, 27(8), 1031-1056. doi: 10.1002/job.406
- Matthieu, M. M., & Ivanoff, A. (2006). Using stress, appraisal, and coping theories in clinical practice: Assessments of coping strategies after disasters. *Brief Treatment and Crisis Intervention*, 6(4), 337. doi:10.1093/brief-treatment/mhl009
- McCullough, M. E., Orsulak, P., Brandon, A., & Akers, L. (2007). Rumination, fear, and cortisol: An in vivo study of interpersonal transgressions. *Health Psychology*, 26(1), 126. doi: 10.1037/0278-6133.26.1.126
- McDonald, I., Connolly, M., & A. Tobin (2012) ‘A Review of Psoriasis, a Known Risk Factor for Cardiovascular Disease and Its Impact on Folate and



- Homocysteine Metabolism', *Journal of Nutrition and Metabolism*, (52) 9-13.  
doi:10.1155/2012/965385
- McEwen, B. S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine*, 338(3), 171-179. doi:  
10.1056/NEJM199801153380307
- McIntosh, W. D., & Martin, L. L. (1992). The cybernetics of happiness: the relation between goal attainment, rumination, and affect. In M. S. Clark (Ed.), *Review of Personality and Social Psychology* (Vol. 14, pp. 222–246). Newbury Park: Sage Publications.
- McIntosh, W. D. (1997). East meets West: parallels between Zen Buddhism and social psychology. *International Journal for Psychology of Religion*, 7, 37–52.  
doi: 10.1207/s15327582ijpr0701\_5
- McLaughlin, K. A., Borkovec, T. D., & Sibrava, N. J. (2007). The effects of worry and rumination on affect states and cognitive activity. *Behavior Therapy*, 38(1), 23-38. doi: 10.1016/j.beth.2006.03.003
- McTavish, D. G., & Pirro, E. B. (1990). Contextual content analysis. *Quality and Quantity*, 24(3), 245-265. doi: 10.1007/BF00139259
- Mendis, N.K.G., (2006). The Abhidhamma in practice. *Access to Insight (BCBS Edition)*. Sri Lanka: Buddhist Publication Society. Retrieved from:  
<http://www.accesstoinsight.org/lib/authors/mendis/wheel322.html>
- Menter, A., Gottlieb, A., Feldman, S. R., Van Voorhees, A. S., Leonardi, C. L., Gordon, K. B., ... & Beutner, K. R. (2008). Guidelines of care for the management of psoriasis and psoriatic arthritis: Section 1. Overview of psoriasis and guidelines of care for the treatment of psoriasis with

- biologics. *Journal of the American Academy of Dermatology*, 58(5), 826-850.  
doi: 10.1016/j.jaad.2008.02.039
- Menaghan, E. G. (1983). Individual coping efforts: Moderators of the relationship between life stress and mental health outcomes. In *Psychosocial Stress* (pp. 157-191). doi: 10.1108/JCP-02-2015-0010
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the penn state worry questionnaire. *Behaviour Research and Therapy*, 28(6), 487-495. doi: 10.1016/0005-7967(90)90135-6
- Miles, J. N., Kulesza, M., Ewing, B., Shih, R. A., Tucker, J. S., & D'Amico, E. J. (2015). Moderated mediation analysis: an illustration using the association of gender with delinquency and mental health. *Journal of Criminal Psychology*, 5(2), 99-123.
- Moon, H. S., Mizara, A., & McBride, S. R. (2013). Psoriasis and psychodermatology. *Dermatology and Therapy*, 3(2), 117-130. doi: 10.1007/s13555-013-0031-0
- Moos, R. H. (1984). Context and coping: Toward a unifying conceptual framework. *American Journal of Community Psychology*, 12(1), 5-36. doi: 10.1007/BF00896933
- Moos, R. H., & Schaefer, J. A. (1993). Coping resources and processes: Current concepts and measures. In L. Goldberger & S. Breznitz (Eds.), *Handbook of Stress: Theoretical and Clinical Aspects* (pp. 234-257). New York, NY, US: Free Press.
- Moos, R. H. (2002). 2001 Invited address: the mystery of human context and coping: an unraveling of clues. *American Journal of Community Psychology*, 30(1), 67-88. doi: 10.1023/A:1014372101550

- Montgomery, K., Norman, P., Messenger, A. G., & Thompson, A. R. (2016). The importance of mindfulness in psychosocial distress and quality of life in dermatology patients. *British Journal of Dermatology*, *175*(5), 930-936. doi: 10.1111/bjd.14719
- Moss, A. S., Reibel, D. K., Greeson, J. M., Thapar, A., Bubb, R., Salmon, J., & Newberg, A. B. (2015). An adapted mindfulness-based stress reduction program for elders in a continuing care retirement community: Quantitative and qualitative results from a pilot randomized controlled trial. *Journal of Applied Gerontology*, *34*(4), 518-538. doi: 10.1177/0733464814559411
- Morey, J. N., Boggero, I. A., Scott, A. B., & Segerstrom, S. C. (2015). Current directions in stress and human immune function. *Current Opinion in Psychology*, *5*, 13-17. doi: 10.1016/j.copsyc.2015.03.007
- Morone, N. E., Lynch, C. S., Greco, C. M., Tindle, H. A., & Weiner, D. K. (2008). "I felt like a new person." The effects of mindfulness meditation on older adults with chronic pain: qualitative narrative analysis of diary entries. *The Journal of Pain*, *9*(9), 841-848. doi: 10.1016/j.jpain.2008.04.003
- Narada Maha Thera. (1987). *A Manual of Abhidhamma*. Malaysia: Buddhist Missionary Society.
- Nash, A. S., McAteer, H., Schofield, J., Penzer, R., & Gilbert, A. K. (2015). Psoriasis today: experiences of healthcare and impact on quality of life in a major UK cohort. *Primary Health Care Research & Development*, *16*(4), 415-423. doi: 10.1017/S1463423614000450
- National Institute of Health and Care Excellence (NICE) (2009). Medicines adherence: Involving patients in decisions about prescribed medicines and supporting adherence. London: NICE.

- Neff, K. D. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity*, 2(3), 223-250. doi: 10.1080/15298860309027
- Neff, K. D. (2003b). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2, 85-102. doi: 10.1080/15298860309032
- Neff, K. D., Kirkpatrick, K. & Rude, S. S. (2007). Self-compassion and its link to adaptive psychological functioning. *Journal of Research in Personality*, 41, 139-154. doi: 10.1016/j.jrp.2006.03.004
- Neff, K. D., & Vonk, R. (2009). Self-compassion versus global self-esteem: Two different ways of relating to oneself. *Journal of Personality*, 77, 23-50. doi: 10.1111/j.1467-6494.2008.00537.x
- Neff, K. D. (2011). *Self-compassion*. New York: William Morrow.
- Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*, 69(1), 28-44. doi: 10.1002/jclp.21923
- Neff, K. D., & Pommier, E. (2013). The relationship between self-compassion and other-focused concern among college undergraduates, community adults, and practicing meditators. *Self and Identity*, 12(2), 160-176. doi: 10.1080/15298868.2011.649546
- Neff, K. D., & Dahm, K. A. (2015). Self-Compassion: What it is, what it does, and how it relates to mindfulness. To appear in in M. Robinson, B. Meier & B. Ostafin (Eds.) *Mindfulness and Self-Regulation*. New York: Springer. doi: 10.1007/978-1-4939-2263-5\_10
- Nelson, P. A., Kane, K., Pearce, C. J., Bundy, C., Chisholm, A., Hilton, R., ... the Identification and Management of Psoriasis-Associated Co morbidity

- (IMPACT) team. (2017). “New to me”: changing patient understanding of psoriasis and identifying mechanisms of change. The Pso Well<sup>®</sup> patient materials mixed-methods feasibility study. *The British Journal of Dermatology*, 177(3), 758–770. doi:10.1111/bjd.15574
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, 100(4), 569. doi: 10.1037/0021-843X.100.4.569
- Nolen-Hoeksema, S. (1998). The other end of the continuum: The costs of rumination. *Psychological Inquiry*, 9(3), 216-219 doi: 10.1207/s15327965pli0903\_5
- Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, 109(3), 504. doi: 10.1037/0021-843X.109.3.504
- Nolen-Hoeksema, S. (2004). The response styles theory. In C. Papageorgiou & A. Wells (Eds), *Depressive Rumination: Nature, Theory and Treatment*, (pp105-123). Retrieved from URL <https://bit.ly/2NVJkY4>
- Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science*, 3(5), 400-424. doi: 10.1111/j.1745-6924.2008.00088.x
- Norcross, J., & Beutler, L. (2008). Integrative Psychotherapies. In R. Corsini & D. Wedding, (Eds.), *Current Psychotherapies (pp.481-511)*. Belmont, CA: Thomson.
- Noren, P. (1995). Habit reversal: a turning point in the treatment of atopic dermatitis. *Clinical and Experimental Dermatology*, 20(1), 1-5. doi: 10.1111/j.1365-2230.1995.tb01273.x

- Odou, N., & Brinker, J. (2014). Exploring the relationship between rumination, self-compassion, and mood. *Self and Identity, 13*(4), 449-459. doi: 10.1080/15298868.2013.840332
- Ohlsson, D. (2014). An Empirical Trial of the Buddhist Psychological Model (Dissertation). Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:hh:diva-25570>
- Olatunji, B., Cisler, J., & Tolin, D. (2007). Quality of life in anxiety disorders: A meta-analytic review. *Clinical Psychology Review, 27*, 572-581.
- O'Doherty, V., Carr, A., McGrann, A., O'Neill, J. O., Dinan, S., Graham, I., & Maher, V. (2015). A controlled evaluation of mindfulness-based cognitive therapy for patients with coronary heart disease and depression. *Mindfulness, 6*(3), 405-416. doi: 10.1007/s12671-013-0272-0
- O'Leary, C. J., Creamer, D., Higgins, E., & Weinman, J. (2004). Perceived stress, stress attributions and psychological distress in psoriasis. *Journal of Psychosomatic Research, 57*(5), 465-471. doi: 10.1016/j.jpsychores.2004.03.012
- Ottenbreit, N. D., & Dobson, K. S. (2004). Avoidance and depression: The construction of the cognitive-behavioral avoidance scale. *Behaviour Research and Therapy, 42*, 293–313. doi: 10.1016/S0005-7967(03)00140-2
- Padgett, D. K. (1998). *Sage Sourcebooks for the Human Services Series, Vol. 36. Qualitative Methods in Social Work Research: Challenges and Rewards*. Thousand Oaks, CA, US: Sage Publications, Inc.
- Panconesi, E., Gallassi, F., Sarti, M. G., & Bellini, M. A. (1998). Biofeedback, cognitive-behavioral methods, hypnosis: “alternative psychotherapy?”. *Clinics in Dermatology, 16*(6), 709-710. doi:10.1016/S0738-081X(98)00060-1

- Papageorgiou, C., & Wells, A. (1999). Process and meta-cognitive dimensions of depressive and anxious thoughts and relationships with emotional intensity. *Clinical Psychology and Psychotherapy*, 6, 156–162. doi: 10.1002/(SICI)1099-0879(199905)6:2<156::AID-CPP196>3.0.CO;2-A
- Parisi, R., Symmons, D. P., Griffiths, C. E., & Ashcroft, D. M. (2013). Global epidemiology of psoriasis: a systematic review of incidence and prevalence. *Journal of Investigative Dermatology*, 133(2), 377-385. doi: 10.1038/jid.2012.339
- Paul, G. L. (1967). Strategy of outcome research in psychotherapy. *Journal of Consulting Psychology*, 31(2), 109. doi: 10.1037/h0024436
- Pauley, G., & McPherson, S. (2010). The experience and meaning of compassion and self-compassion for individuals with depression or anxiety. *Psychology and Psychotherapy: Theory, Research and Practice*, 83, 129–143. doi: /10.1348/147608309X471000
- Penley, J. A., Tomaka, J., & Wiebe, J. S. (2002). The association of coping to physical and psychological health outcomes: A meta-analytic review. *Journal of behavioral medicine*, 25(6), 551-603.
- Picardi, A., Amerio, P., Baliva, G., Barbieri, C., Teofoli, P., Bolli, S., ... & Abeni, D. (2004). Recognition of depressive and anxiety disorders in dermatological outpatients. *Acta Dermato-Venereologica*, 84(3). doi: [10.1080/00015550410025264](https://doi.org/10.1080/00015550410025264)
- Piccinelli, M., & Wilkinson, G. (2000). Gender differences in depression: Critical review. *The British Journal of Psychiatry*, 177(6), 486-492. doi: 10.1192/bjp.177.6.486

- Piet, J., & Hougaard, E. (2011). The effect of mindfulness-based cognitive therapy for prevention of relapse in recurrent major depressive disorder: a systematic review and meta-analysis. *Clinical Psychology Review, 31*(6), 1032-1040. doi: 10.1016/j.cpr.2011.05.002
- Poikolainen, K., Reunala, T., Karvonen, J., Lauharanta, J., & Kärkkäinen, P. (1990). Alcohol intake: a risk factor for psoriasis in young and middle aged men? *BMJ, 300*(6727), 780-783. doi:10.1136/bmj.300.6727.780
- Pope, C., & Mays, N. (1995). Qualitative research: reaching the parts other methods cannot reach: an introduction to qualitative methods in health and health services research. *BMJ, 311*(6996), 42-45. doi: 10.1136/bmj.311.6996.42
- Pots, W. T., Meulenbeek, P. A., Veehof, M. M., Klungers, J., & Bohlmeijer, E. T. (2014). The efficacy of mindfulness-based cognitive therapy as a public mental health intervention for adults with mild to moderate depressive symptomatology: A randomized controlled trial. *PloS one, 9*(10), e109789. doi: 10.1371/journal.pone.0109789
- Potter, W. J., & Levine-Donnerstein, D. (1999). Rethinking validity and reliability in content analysis. *Journal of Applied Communication Research*. doi: 10.1080/00909889909365539
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891. doi: 10.3758/BRM.40.3.879
- Price, D., Finniss, D. G., & Benedetti, F. (2008). A comprehensive review of the placebo effect: recent advances and current thought. *Annual Review of Psychology, 59*, 565-590. doi: 10.1146/annurev.psych.59.113006.095941



- Rabner, J., Mian, N., Langer, D., Comer, J., & Pincus, D. (2017) The relationship between worry and dimensions of anxiety symptoms in children and adolescents. *Behavioural Cognitive Psychotherapy*, 45(2), 124-138.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied psychological measurement*, 1(3), 385-401.  
doi: 10.1177/014662167700100306
- Raes, F., Dewulf, D., Van Heeringen, C., & Williams, J. M. G. (2009). Mindfulness and reduced cognitive reactivity to sad mood: Evidence from a correlational study and a non-randomized waiting list controlled study. *Behaviour Research and Therapy*, 47(7), 623-627. doi: 10.1016/j.brat.2009.03.007
- Raes, F., & Williams, J. M. G. (2010). The relationship between mindfulness and uncontrollability of ruminative thinking. *Mindfulness*, 1(4), 199-203.  
doi:10.1007/s12671-010-0021-6
- Raes, F. (2010). Rumination and worry as mediators of the relationship between self-compassion and depression and anxiety. *Personality and Individual Differences*, 48(6), 757-761. doi: 10.1016/j.paid.2010.01.023
- Rapp, S. R., Feldman, S. R., Exum, M. L., Fleischer Jr, A. B., & Reboussin, D. M. (1999). Psoriasis causes as much disability as other major medical diseases. *Journal of the American Academy of Dermatology*, 41(3), 401-407.  
doi: 10.1016/S0190-9622(99)70112-X
- Reddy, P., Philpot, B., Ford, D., & Dunbar, J. A. (2010). Identification of depression in diabetes: the efficacy of PHQ-9 and HADS-D. *British Journal of General Practice*, 60(575), e239-e245. doi: 10.3399/bjgp10X502128
- Richards, H. L., Fortune, D. G., Griffiths, C. E., & Main, C. J. (2001). The contribution of perceptions of stigmatisation to disability in patients with

- psoriasis. *Journal of Psychosomatic Research*, 50(1), 11-15. doi:  
10.1016/S0022-3999(00)00210-5
- Richards, H. L., Fortune, D. G., Weidmann, A., Sweeney, S. K. T., & Griffiths, C. E. M. (2004). Detection of psychological distress in patients with psoriasis: low consensus between dermatologist and patient. *British Journal of Dermatology*, 151(6), 1227-1233. doi: 10.1111/j.1365-2133.2004.06221.x
- Richards, H. L., Ray, D. W., Kirby, B., Mason, D., Plant, D., Main, C. J., ... & Griffiths, C. E. M. (2005). Response of the hypothalamic–pituitary–adrenal axis to psychological stress in patients with psoriasis. *British Journal of Dermatology*, 153(6), 1114-1120. doi: 10.1111/j.1365-2133.2005.06817.x
- Rieder, E., & Tausk, F. (2012). Psoriasis, a model of dermatologic psychosomatic disease: psychiatric implications and treatments. *International Journal of Dermatology*, 51(1), 12-26. doi: 10.1111/j.1365-4632.2011.05071.x
- Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In A. Bryman & R.G. Burgess, (Eds.), *Analysing qualitative data (pp.173-194)*. London: Routledge.
- Rothman, K. J. (1990). No adjustments are needed for multiple comparisons. *Epidemiology*, 43-46. Retrieved from <https://insights.ovid.com/epidemiology/epide/1990/01/000/no-adjustments-needed-multiple-comparisons/10/00001648>
- Ruff, K. M., & Mackenzie, E. R. (2009). The role of mindfulness in healthcare reform: a policy paper. *Explore: The Journal of Science and Healing*, 5(6), 313-323. doi: 10.1016/j.explore.2009.10.002

- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52(1), 141-166. doi: 10.1146/annurev.psych.52.1.141
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57(6), 1069-1081. doi: 10.1037/0022-3514.57.6.1069
- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, 69(4), 719. doi: 10.1037/0022-3514.69.4.719
- Safran, J. D., & Segal, Z. V. (1990). *Interpersonal Process in Cognitive Therapy*. New York: Basic Books.
- Sahdra, B. K., Shaver, P. R., & Brown, K. W. (2010). A scale to measure nonattachment: A Buddhist complement to Western research on attachment and adaptive functioning. *Journal of Personality Assessment*, 92(2), 116-127. doi: 10.1080/00223890903425960
- Sakson-Obada, O., Pawlaczyk, M., Gerke, K., & Adamski, Z. (2017) Acceptance of psoriasis in the context of body image, body experience, and social support. *Health Psychology Report*, 3(1). doi: 10.5114/hpr.2017.63824
- Salkovskis, P. M. (1996a). The cognitive approach to anxiety: threat beliefs, safety-seeking behaviour, and the special case of health anxiety and obsessions. In P. M. Salkovskis, *Frontiers of Cognitive Therapy* (pp. 48 - 74). New York: Guilford.
- Salkovskis, P. M. (1996b). Cognitive-behavioural approaches to the understanding of obsessional problems. In R. Rapee, (Ed.). *Current Controversies in the Anxiety Disorders*. New York: Guilford.

- Salovey, P., Rothman, A. J., Detweiler, J. B., & Steward, W. T. (2000). Emotional states and physical health. *American Psychologist*, *55*, 110–121. doi: 10.1037/0003-066X.55.1.110
- Sampogna, F., Tabolli, S., Abeni, D., & IDI Multipurpose Psoriasis Research on Vital Experiences (IMPROVE) investigators. (2007). The impact of changes in clinical severity on psychiatric morbidity in patients with psoriasis: a follow-up study. *British Journal of Dermatology*, *157*(3), 508-513. doi: 10.1111/j.1365-2133.2007.08071.x
- Sampogna, F., Tabolli, S., & Abeni, D. (2012). Living with psoriasis: prevalence of shame, anger, worry, and problems in daily activities and social life. *Acta Dermato-Venereologica*, *92*(3), 299-303. doi: 10.2340/00015555-1273.
- Sanders, W. A., & Lam, D. H. (2010). Ruminative and mindful self-focused processing modes and their impact on problem solving in dysphoric individuals. *Behaviour Research and Therapy*, *48*(8), 747-753. doi: 10.1016/j.brat.2010.04.007
- Say, R., & Thomson, R. (2003). The importance of patient preferences in treatment decisions – challenges for doctors. *BMJ*, *327*(7414), 542-545.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: our view of the state of the art. *Psychological Methods*, *7*(2), 147. doi: 10.1037//1082-989X.7.2.147
- Scherer, K.R., (2001). Appraisal considered as a process of multilevel sequential checking. In: Scherer, K.R., Schorr, A., & Johnstone, T. (Eds.). *Appraisal Processes in Emotion: Theory, Methods, Research*. (pp. 92–120). Oxford: Oxford University Press.

- Schmitt, J., & Wozel, G. (2005). The psoriasis area and severity index is the adequate criterion to define severity in chronic plaque-type psoriasis. *Dermatology*, 210(3), 194-199. doi: 10.1159/000083509
- Schmitt, J. & D. E. Ford (2007) 'Understanding the relationship between objective disease severity, psoriatic symptoms, illness-related stress, health-related quality of life and depressive symptoms in patients with psoriasis - a structural equations modeling approach', *General Hospital Psychiatry*, 29(2): 134-140. doi: 10.1016/j.genhosppsy.2006.12.004
- Schmitt, J., & Ford, D. E. (2010). Psoriasis is independently associated with psychiatric morbidity and adverse cardiovascular risk factors, but not with cardiovascular events in a population-based sample. *Journal of the European Academy of Dermatology and Venereology*, 24(8), 885-892. doi:10.1111/j.1468-3083.2009.03537.x
- Schneider, G., Heuft, G., & Hockmann, J. (2013). Determinants of social anxiety and social avoidance in psoriasis outpatients. *Journal of the European Academy of Dermatology and Venereology*, 27(3), 383-386. doi: 10.1111/j.1468-3083.2011.04307.x
- Schulz, K. F., Altman, D. G., & Moher, D. (2010). CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. *BMC Medicine*, 8(1), 18. doi: 10.1186/1741-7015-8-18
- Schumacker, R. E., & Lomax, R. G. (2016). *A Beginners Guide to Structural Equation Modeling* (4<sup>th</sup> ed). New York, NY: Routledge.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-Based Cognitive Therapy for Depression*. New York, NY, US: Guilford Press.

- Segerstrom, S. C., Tsao, J. C. I., Alden, L. E., & Craske, M. G. (2000). Worry and rumination: Repetitive thought as a concomitant and predictor of negative mood. *Cognitive Therapy and Research, 24*, 671–688. doi: 10.1023/A:1005587311498
- Segerstrom, S. C., Stanton, A. L., Alden, L. E., & Shortridge, B. E. (2003). Multidimensional structure for repetitive thought: What's on your mind and how, and how much? *Journal of Personality and Social Psychology, 85*(5), 909–921. doi: 10.1037/0022-3514.85.5.909
- Senn, S. (1994). Testing for baseline balance in clinical trials. *Statistics in Medicine, 13*(17), 1715-1726. doi: 10.1002/sim.4780131703
- Shah, R., & Bewley, A. (2014). Psoriasis: 'the badge of shame'. A case report of a psychological intervention to reduce and potentially clear chronic skin disease. *Clinical and Experimental Dermatology, 39*(5), 600-603. Doi: 10.1111/ced.12339
- Shahar, B., Britton, W. B., Sbarra, D. A., Figueredo, A. J., & Bootzin, R. R. (2010). Mechanisms of change in mindfulness-based cognitive therapy for depression: Preliminary evidence from a randomized controlled trial. *International Journal of Cognitive Therapy, 3*(4), 402-418. doi: 10.1521/ijct.2010.3.4.402
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*(3), 373-386. doi: 10.1002/jclp.20237
- Shapiro, S. L., Brown, K. W., & Biegel, G. M. (2007). Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training. *Training and Education in Professional Psychology, 1*(2), 105. doi: 10.1037/1931-3918.1.2.105

- Shapiro, S. L., & Jazaieri, H. (2015). Mindfulness-based stress reduction for healthy stressed adults. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook of Mindfulness: Theory, Research, and Practice Handbook of Mindfulness: Theory and research*, (pp. 269-282). New York, NY, US: Guilford Press.
- Shontz, F. C. (1975). *The Psychological Aspects of Physical Illness and Disability*. MacMillan Publishing Company.
- Siegle, G. J., Sgrati, S., & Crawford, C. E. (1999, November). Effects of rumination and initial severity on response to cognitive therapy for depression. In *33rd Annual Convention of the Association for the Advancement of Behavior Therapy, Toronto*.
- Sloan, D. M. (2004). Emotion regulation in action: Emotional reactivity in experiential avoidance. *Behaviour Research and Therapy*, 42(11), 1257-1270. doi: 10.1016/j.brat.2003.08.006
- Smeets, E., Neff, K., Alberts, H., & Peters, M. (2014). Meeting suffering with kindness: Effects of a brief self-compassion intervention for female college students. *Journal of Clinical Psychology*, 70(9), 794-807. doi: 10.1002/jclp.22076
- Smith, J. E., Richardson, J., Hoffman, C., & Pilkington, K. (2005). Mindfulness-Based Stress Reduction as supportive therapy in cancer care: systematic review. *Journal of Advanced Nursing*, 52(3), 315-327. doi: 10.1111/j.1365-2648.2005.03592.x
- Smith, J. M., & Alloy, L. B. (2009). A roadmap to rumination: A review of the definition, assessment, and conceptualization of this multifaceted

construct. *Clinical Psychology Review*, 29(2), 116–128.

<http://doi.org/10.1016/j.cpr.2008.10.003>

- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stankovic, L. (2011). Transforming trauma: a qualitative feasibility study of integrative restoration (iRest) yoga Nidra on combat-related post-traumatic stress disorder. *International Journal of Yoga Therapy*, 21(1), 23-37. doi: 10.17761/ijyt.21.1.v823454h5v57n160
- Starcevic, V. (1995). Pathological worry in major depression: A preliminary report. *Behaviour Research and Therapy*, 33(1), 55-56. doi: 10.1016/0005-7967(93)E0028-4
- Stowell, J. R., Kiecolt-Glaser, J. K., & Glaser, R. (2001). Perceived stress and cellular immunity: When coping counts. *Journal of Behavioral Medicine*, 24(4), 323-339. doi: 0.1023/A:1010630801589
- Strauss, C., Cavanagh, K., Oliver, A., & Pettman, D. (2014). Mindfulness-based interventions for people diagnosed with a current episode of an anxiety or depressive disorder: a meta-analysis of randomised controlled trials. *PLoS One*, 9(4), e96110. doi: 10.1371/journal.pone.0096110
- Strohal, R., Kirby, B., Puig, L., & Psoriasis Expert Panel (G. Girolomoni, K. Kragballe, T. Luger, FO Nestle, JC Prinz, M. Stähle, N. Yawalkar). (2014). Psoriasis beyond the skin: an expert group consensus on the management of psoriatic arthritis and common co-morbidities in patients with moderate-to-severe psoriasis. *Journal of the European Academy of Dermatology and Venereology*, 28(12), 1661-1669. doi: 10.1111/jdv.12350



- Suls, J., & Rothman, A. (2004). Evolution of the Biopsychosocial Model: Prospects and Challenges for Health Psychology. *Health Psychology, 23*(2), 119-125. doi.org/10.1037/0278-6133.23.2.119
- Svendsen, J. L., Osnes, B., Binder, P. E., Dundas, I., Visted, E., Nordby, H., ... & Sørensen, L. (2016). Trait self-compassion reflects emotional flexibility through an association with high vagally mediated heart rate variability. *Mindfulness, 7*(5), 1103-1113. doi: 10.1007/s12671-016-0549-1
- Svendsen, J. L., Kvernenes, K. V., Wiker, A. S., & Dundas, I. (2017). Mechanisms of mindfulness: Rumination and self-compassion. *Nordic Psychology, 69*(2), 71-82. doi: 10.1080/19012276.2016.1171730
- Szabo, T. G., Long, D. M., Villatte, M., & Hayes, S. C. (2015). Mindfulness in contextual cognitive-behavioral models. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook of Mindfulness: Theory, Research, and Practice* (pp. 130-147). New York, NY, US: Guilford Press.
- Szekeres, R., & Wertheim, E. (2014) 'Evaluation of Vipassana Meditation Course Effects on Subjective Stress, Well-being, Self-kindness and Mindfulness in a Community Sample: Post-course and 6-month Outcomes', *Stress and Health*, Published Online: Retrieved from: <http://onlinelibrary.wiley.com/doi/10.1002/smi.2562/abstract>
- Tang, Y. Y., & Posner, M. I. (2015). Mindfulness in the Context of the Attention System. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook of Mindfulness: Theory, Research, and Practice* (pp. 81-89). New York, NY, US: Guilford Press.

- Tashakkori, A., & Teddlie, C. (2008). Quality of inferences in mixed methods research: Calling for an integrative framework. *Advances in Mixed Methods Research*, 101-119.
- Teasdale, J. D., Segal, Z., & Williams, J. M. G. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy*, 33(1), 25-39. doi: 10.1016/0005-7967(94)E0011-7
- Teasdale, J. D., Segal, Z. V., Williams, J. M. G., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology*, 68(4), 615-623. doi: 10.1037/0022-006X.68.4.615
- Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: empirical evidence. *Journal of Consulting and Clinical Psychology*, 70(2), 275. doi: 10.1037/0022-006X.70.2.275
- Teasdale, J. D., Segal, Z. V., & Williams, J. M. G. (2003). Mindfulness training and problem formulation. *Clinical Psychology: Science and Practice*, 10(2), 157-160. doi: 10.1093/clipsy.bpg017
- Teasdale, J. D., & Chaskalson, M. (2011). How does mindfulness transform suffering? I: the nature and origins of dukkha. *Contemporary Buddhism*, 12(01), 89-102. doi: 10.1080/14639947.2011.564824
- Teddlie, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. *Handbook of Mixed Methods in Social & Behavioral Research*, 3-50.

- Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: distinguishing rumination from reflection. *Journal of Personality and Social Psychology*, 76(2), 284. doi: 10.1037/0022-3514.76.2.284
- Thera, N. (1992). *The Heart of Buddhist Meditation*. Sri Lanka: Buddhist Publication Society.
- Tinetti, M., & Fried, T. (2004). The of the disease era. *The American Journal of Medicine*, 116(3), 179-185.
- Tyring, S., Gottlieb, A., Papp, K., Gordon, K., Leonardi, C., Wang, A., ... & Krishnan, R. (2006). Etanercept and clinical outcomes, fatigue, and depression in psoriasis: double-blind placebo-controlled randomised phase III trial. *The Lancet*, 367(9504): 29-35.
- Unrau, Y. A., & Grinnell, R. M. (Eds.). (2011). *Social Work Research and Evaluation: Foundations of Evidence-Based Practice*. Oxford University Press.
- Ursin, H., & Eirksen, H.R. (2004). The cognitive activation theory of stress. *Psychoneuroendocrinology*, 29(5), 567-592. doi: 10.1016/S0306-4530(03)00091-X
- Van Aalderen, J. R., Donders, A. R. T., Giommi, F., Spinhoven, P., Barendregt, H. P., & Speckens, A. E. M. (2012). The efficacy of mindfulness-based cognitive therapy in recurrent depressed patients with and without a current depressive episode: A randomized controlled trial. *Psychological Medicine*, 42(5), 989–1001. doi:10.1017/S0033291711002054
- Van Breukelen, G. J. (2006). ANCOVA versus change from baseline had more power in randomized studies and more bias in nonrandomized studies. *Journal of*

- Clinical Epidemiology*, 59(9), 920-925. doi: 10.1016/j.jclinepi.2006.02.007
- Van Dam, N. T., Sheppard, S. C., Forsyth, J. P., & Earleywine, M. (2011). Self-compassion is a better predictor than mindfulness of symptom severity and quality of life in mixed anxiety and depression. *Journal of Anxiety Disorders*, 25(1), 123-130. doi: 10.1016/j.janxdis.2010.08.011.
- Van Dam, N. T., Hobkirk, A. L., Sheppard, S. C., Aviles-Andrews, R., & Earleywine, M. (2014). How does mindfulness reduce anxiety, depression, and stress? An exploratory examination of change processes in wait-list controlled mindfulness meditation training. *Mindfulness*, 5(5), 574-588. doi: 10.1007/s12671-013-0229-3
- Van Dam, N. T., van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., ... & Fox, K. C. (2018). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science*, 13(1), 36-61. doi: 10.1177/1745691617709589
- Van Der Velden, A. M., Kuyken, W., Wattar, U., Crane, C., Pallesen, K. J., Dahlgaard, J., ... & Piet, J. (2015). A systematic review of mechanisms of change in mindfulness-based cognitive therapy in the treatment of recurrent major depressive disorder. *Clinical Psychology Review*, 37, 26-39. doi: 10.1016/j.cpr.2015.02.001
- Vedhara, K., Morris, R. M., Booth, R., Horgan, M., Lawrence, M., & Birchall, N. (2007). Changes in mood predict disease activity and quality of life in patients with psoriasis following emotional disclosure. *Journal of Psychosomatic Research*, 62(6), 611-619. doi: 10.1016/j.jpsychores.2006.12.017
- Velotti, P., Garofalo, C., & Bizzi, F. (2015). Emotion dysregulation mediates the relation between mindfulness and rejection sensitivity. *Psychiatria*

*Danubina*, 27(3), 0-272. Retrieved online:

[https://hrcak.srce.hr/index.php?show=clanak&id\\_clanak\\_jezik=239522&lang=en](https://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=239522&lang=en)

- Verhoef, M. J., Casebeer, A. L., & Hilsden, R. J. (2002). Assessing efficacy of complementary medicine: adding qualitative research methods to the "Gold Standard". *The Journal of Alternative & Complementary Medicine*, 8(3), 275-281. doi: 10.1089/10755530260127961
- Vøllestad, J., Sivertsen, B., & Nielsen, G. H. (2011). Mindfulness-based stress reduction for patients with anxiety disorders: Evaluation in a randomized controlled trial. *Behaviour Research and Therapy*, 49(4), 281-288. doi: 10.1016/j.brat.2011.01.007
- Wadlinger, H. A., & Isaacowitz, D. M. (2011). Fixing our focus: Training attention to regulate emotion. *Personality and Social Psychology Review*, 15(1), 75-102. doi: 10.1177/1088868310365565
- Wahl, A., Moum, T., Hanestad, B. R., & Wiklund, I. (1999). The relationship between demographic and clinical variables, and quality of life aspects in patients with psoriasis. *Quality of Life Research*, 8(4), 319-326. doi: 10.1023/A:1008935921866
- Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—the Freiburg mindfulness inventory (FMI). *Personality and Individual Differences*, 40(8), 1543-1555. doi: 10.1016/j.paid.2005.11.025
- Wang, J., & Dunn, A.J. (1998). Mouse interleukin-6 stimulates the HPA axis and increases brain tryptophan and serotonin metabolism. *Neurochemistry International*, 33(2), 143-154.

- Watkins, E. (2004). Appraisals and strategies associated with rumination and worry. *Personality and Individual Differences, 37*, 679–694. doi: 10.1016/j.paid.2003.10.002
- Watkins, E. (2008). Constructive and unconstructive thought. *Psychological Bulletin, 134*(2), 163–206. doi: 10.1037/0033-2909.134.2.163
- Watkins, E. R. (2015). Mindfulness in the context of processing mode theory. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook of Mindfulness: Theory, Research, and Practice* (pp. 90-111). New York, NY, US: Guilford Press.
- Wallace, B. A., & Shapiro, S. L. (2006). Mental balance and well-being: Building bridges between Buddhism and western psychology. *American Psychologist, 61*, 690–701. doi: 10.1037/0003-066X.61.7.690
- Weber, R. P. (1990). *Basic content analysis* (Vol. 49). Newbury, California: Sage Publications Inc.
- Weinstein, N., Brown, K. W., & Ryan, R. M. (2009). A multi-method examination of the effects of mindfulness on stress attribution, coping, and emotional well-being. *Journal of Research in Personality, 43*(3), 374-385. doi: 10.1016/j.jrp.2008.12.008
- Wenzlaff, R. M., & Luxton, D. D. (2003). The role of thought suppression in depressive rumination. *Cognitive Therapy and Research, 27*(3), 293-308. doi: 10.1023/A:1023966400540
- Werner, K. H., Jazaieri, H., Goldin, P. R., Ziv, M., Heimberg, R. G., & Gross, J. J. (2012). Self-compassion and social anxiety disorder. *Anxiety, Stress & Coping, 25*(5), 543-558. doi: 10.1080/10615806.2011.608842
- Westen, D. (1996). *Psychology: Mind, Brain, & Culture*. John Wiley & Sons.

- Williams, J. M. G., & Kabat-Zinn, J. (2011). Mindfulness: diverse perspectives on its meaning, origins, and multiple applications at the intersection of science and dharma. *Contemporary Buddhism*, *12*(01), 1-18. doi: 10.1080/14639947.2011.564811
- Williams, J. M. G., & Kuyken, W. (2012). Mindfulness-based cognitive therapy: a promising new approach to preventing depressive relapse. *FOCUS*, *10*(4), 489-491. doi: 10.1192/bjp.bp.111.104745
- Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample Size Requirements for Structural Equation Models: An Evaluation of Power, Bias, and Solution Propriety. *Educational and Psychological Measurement*, *76*(6), 913–934. <http://doi.org/10.1177/0013164413495237>
- World Health Organization. (2017). *Depression and other common mental disorders: global health estimates*. Geneva: World Health Organization. Retrieved from: <http://apps.who.int/iris/bitstream/handle/10665/254610/WHOMSD?sequence=1>
- Wu, A. D., & Zumbo, B. D. (2008). Understanding and using mediators and moderators. *Social Indicators Research*, *87*(3), 367. doi: 10.1007/s11205-007-9143-1
- Yu, A. P., Tang, J., Xie, J., Wu, E. Q., Gupta, S. R., Bao, Y., & M. Mulani, P. (2009). Economic burden of psoriasis compared to the general population and stratified by disease severity. *Current Medical Research and Opinion*, *25*(10), 2429-2438. doi: 10.1185/03007990903185557
- Zachariae, R., Øster, H., Bjerring, P., & Kragballe, K. (1996). Effects of psychologic intervention on psoriasis: a preliminary report. *Journal of the American*

*Academy of Dermatology*, 34(6), 1008-1015. doi: 10.1016/S0190-9622(96)90280-7

Zalewska, A., Miniszewska, J., Chodkiewicz, J., & Narbutt, J. (2007). Acceptance of chronic illness in psoriasis vulgaris patients. *Journal of the European Academy of Dermatology and Venereology*, 21(2), 235-242. doi: 10.1111/j.1468-3083.2006.01912.x

Zbytek, B., Mysliwski, A., Slominski, A., Wortsman, J., Wei, E., & Mysliwska, J. (2002). Corticotropin-releasing hormone affects cytokine production in human HaCaT keratinocytes. *Life Sciences*, 70(9), 1013–1021.

Zercher, F., Schmidt, P., Ciecuch, J., & Davidov, E. (2015). The comparability of the universalism value over time and across countries in the European Social Survey: exact vs. approximate measurement invariance. *Frontiers in Psychology*, 6, 733. doi: 10.3389/fpsyg.2015.00733

Zessin, U., Dickhäuser, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: A meta-analysis. *Applied Psychology: Health and Well-Being*, 7(3), 340-364. doi:10.1111/aphw.12051

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, 67(6), 361-370. doi: 10.1111/j.1600-0447.1983.tb09716.x



## APPENDIX 1: Ethical Approval Letters

# St. Vincent's HealthCare

GROUP LIMITED



Ethics and Medical Research Committee

ELM PARK, DUBLIN 4

Tel. (01) 2214117 Fax (01) 2214428

email: [joan.mcdonnell@ucd.ie](mailto:joan.mcdonnell@ucd.ie) or [jacinta.mcmanus@ucd.ie](mailto:jacinta.mcmanus@ucd.ie)

7<sup>th</sup> December, 2015.

Dr. P. D'Alton,  
Clinical Psychologist,  
St. Vincent's University Hospital,  
Elm Park,  
Dublin 4.

**Re:-** Examining individual differences in well-being and symptom reduction through the lens of the Buddhist Psychological Model (BPM).  
**Covering Letter Dated December 2015. Revised Standard Application Form Version 2 December 2015. Study A: PIL/Consent version 2 December 2015. Study B: PIL/Consent version 2 December 2015. Study C: PIL/Consent vs 2 December 2015. Interview schedule.**  
Checklist. Detailed Study Protocol. Questionnaires.

Dear Dr. D'Alton,

We have received the revised documents and clarifications that were requested at the Ethics and Medical Research Committee meeting held on Wednesday 4<sup>th</sup> November 2015 at which the above study was reviewed.

Following review of the revised documents and clarifications, this study is now granted full ethical approval.

Yours sincerely,

---

Dr. E. Molloy,  
Chairman,  
Ethics & Medical Research Committee  
cc Mr Alan Maddock, Trinity College Dublin.  
Professor B. Kirby, Consultant Dermatologist, SVUH



F.A.O. Alan Maddock

**School of Psychology Research Ethics Committee**

12<sup>th</sup> January 2016

Dear Alan,

The School of Psychology Research Ethics Committee has reviewed your application entitled "Identifying the therapeutic mechanisms of Mindfulness" and I am pleased to inform you that it was approved.

Please note that you will be required to submit a completed **Project Annual Report Form** on each anniversary of this approval, until such time as the research is complete and the thesis is submitted. The form is available for download from the Ethics section of the School website.

Adverse events associated with the conduct of this research must be reported immediately to the Chair of the Ethics Committee.

Yours sincerely,

Richard Carson  
Chair,  
School of Psychology Research Ethics Committee

**SCHOOL OF PSYCHOLOGY**  
**Áras an Phiarsaigh**  
**Trinity College**  
**Dublin 2**



ELM PARK, DUBLIN 4

Department of dermatology

## Study A PARTICIPANT INFORMATION AND CONSENT FORM

**STUDY TITLE:** Examining individual differences in well-being and symptom reduction through the lens of the Buddhist Psychological Model (BPM).

**NAME OF PRINCIPAL INVESTIGATORS: Professor Brian Kirby, Consultant Dermatologist & Dr. Paul D'Alton, Clinical Psychologist.** You are being invited to participate in a research study. Thank you for taking time to read this.

### WHAT IS THE PURPOSE OF THIS STUDY?

The aim of the study is to examine individual differences in well-being and symptom reduction in a psoriasis patient sample through the processes identified in the Buddhist Psychological Model. By examining these differences it is hoped that psychological interventions which may support psoriasis patients may be developed. This study is being conducted by Mr Alan Maddock who is a PhD scholar from Trinity College Dublin under the supervision of Dr. Paul D'Alton. Dr. Paul D'Alton is the head of the Psychological Society of Ireland, a clinical psychologist and the head of the Psycho-Oncology department in St. Vincent's Hospital.

### WHY HAVE I BEEN CHOSEN?

You have been chosen for this study as you are a Psoriasis patient in the Department of Dermatology in St. Vincent's Hospital.

### WHAT WILL HAPPEN IF I VOLUNTEER?

Your participation is entirely voluntary. Prof. Kirby will explain the study to you, and ascertain if you are interested in being involved in the study. If you are interested, then the researcher Alan Maddock will give you this information sheet and ask you to read it in full. If you are happy to take part the researcher Alan Maddock will ask you to read and sign the consent form and then ask you to begin filling in the questionnaires with Alan Maddock's assistance if necessary.

If you initially decide to take part you can subsequently change your mind without difficulty. This will not affect your future treatment in any way. If you agree to participate, you will be requested to complete some questionnaires on three occasions, (1) at entry to the study, (2) 4 months afterwards, (3) and 8 months afterwards. It will take 45 minutes approximately to fill in these questionnaires, which will be given to you to fill in on a paper format with a pen. These questionnaires will look at different aspects of your personality and psychological functioning.

You can withdraw from the study at any point up until the research data is submitted for examination purposes.

Under the Freedom of Information Act, 2000, you have the right to access data collected from you during the course of the research.

### **ARE THERE ANY BENEFITS FROM MY PARTICIPATION?**

You may not benefit directly from taking part in this study but the information we will obtain may provide further knowledge of this condition and aid in the development of psychological supports for this condition.

### **ARE THERE ANY RISKS INVOLVED IN PARTICIPATING?**

There are minimal risks associated with this study. You may become distressed in the course of answering the questionnaires, but you will have access to Dr. Paul D'Alton who is a Clinical Psychologist.

### **WHAT HAPPENS IF I DO NOT AGREE TO PARTICIPATE?**

If you decide not to participate in this study your treatment will not be affected in any way.

### **CONFIDENTIALITY**

Your identity will remain confidential. A study number will identify you. Your name will not be published or disclosed to anyone.

### **COMPENSATION**

Your doctors are adequately insured by virtue of their participation in the clinical indemnity scheme.

### **WHO IS ORGANISING AND FUNDING THIS RESEARCH?**

This study is organised and funded by Health Research Board.

### **HAS THIS STUDY BEEN REVIEWED BY AN ETHICS COMMITTEE?**

The St. Vincent's Healthcare Group, Ethics and Medical Research Committee have reviewed and approved this study.

### **CONTACT DETAILS**

Name of Researcher: Mr. Alan Maddock

CORU Registered Social Worker

Researchers Email Address: [maddocka@tcd.ie](mailto:maddocka@tcd.ie)

Researchers Telephone Number: 896 2406

Research Supervisor: Dr. David Hevey

Clinical Psychologist/Academic Supervisor

Researcher Supervisors Email Address: [heveydt@tcd.ie](mailto:heveydt@tcd.ie)

Phone: 896 2406

Research Supervisor: Dr. Paul D'Alton

Clinical Psychologist

Researcher Supervisors Email Address: [P.D'Alton@st-vincent's.ie](mailto:P.D'Alton@st-vincent's.ie)

Phone: 01 221 4000

Research Supervisor: Professor. Brian Kirby

Consultant Dermatologist

Researcher Supervisors Email Address: [B.Kirby@svuh.ie](mailto:B.Kirby@svuh.ie)

Phone: 01 2638816

**PLEASE TICK YOUR RESPONSE IN THE APPROPRIATE BOX**

- I have read and understood the Participant Information YES  NO
- I have had the opportunity to ask questions and discuss the study YES  NO
- I have received satisfactory answers to all my questions YES  NO
- I have received enough information about this study YES  NO
- I understand that I am free to withdraw from the study at any time without giving a reason and without this affecting my future medical care YES  NO
- I agree to take part in the study YES  NO

Participant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Participant's Name in print: \_\_\_\_\_

Investigator's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Investigator's Name in print: \_\_\_\_\_



ELM PARK, DUBLIN 4

Department of dermatology

## **Study B PARTICIPANT INFORMATION AND CONSENT FORM**

**STUDY TITLE:** Examining individual differences in well-being and symptom reduction through the lens of the Buddhist Psychological Model (BPM).

**NAME OF PRINCIPAL INVESTIGATOR:** **Professor B. Kirby**  
**Consultant Dermatologist & Dr. Paul D'Alton, Clinical Psychologist**

You are being invited to participate in a research study. Thank you for taking time to read this.

### **WHAT IS THE PURPOSE OF THIS STUDY?**

The aim of the study is to examine the effect that engaging in a mindfulness intervention has on psoriasis patient's well-being and symptom reduction. This study is being conducted by Mr Alan Maddock who is a PhD scholar from Trinity College Dublin under the supervision of Dr. Paul D'Alton. Dr. Paul D'Alton is the head of the Psychological Society of Ireland, a clinical psychologist and the head of the Psycho-Oncology department in St. Vincent's Hospital.

### **WHY HAVE I BEEN CHOSEN?**

You have been chosen for this study as you are a Psoriasis patient in the Department of Dermatology in St. Vincent's Hospital.

### **WHAT WILL HAPPEN IF I VOLUNTEER?**

Your participation is entirely voluntary. Prof. Kirby will explain the study to you, and ascertain if you are interested in being involved in the study. If you are interested, then the researcher Alan Maddock will give you this information sheet and ask you to read it in full. If you are happy to take part the researcher Alan Maddock will ask you to read and sign the consent form and then ask you to begin filling in the questionnaires with Alan Maddock's assistance if necessary.

If you initially decide to take part you can subsequently change your mind without difficulty. This will not affect your future treatment in any way. If you agree to participate, you will be assigned at random to one of two groups, either a group that will receive an 8-week Mindfulness based cognitive therapy intervention (MBCT), which will take place each week, for 2.5 hours approximately, or to a group, which will receive their usual medical treatment. MBCT combines the ideas of cognitive therapy with meditative practices with the aim of allowing participants to reduce their negative thinking about the past and future by learning skills that will allow them to focus on the present. This group intervention will take place in St. Vincent's Hospital. Members of both groups will be requested to complete some questionnaires taking approximately 45 minutes prior to the mindfulness group beginning, after the group has been completed and four months after completion of the group. Participants will also be requested to give a 20mls blood sample before the intervention and after the intervention has been completed. These questionnaires will look at different aspects of your personality and psychological functioning, and will be given to you to fill in on a paper format with a pen. You may also be requested to take part in a semi-structured interview, which will explore your experience of being a part of the Mindfulness based cognitive therapy (MBCT) group. This interview will necessitate another visit to St. Vincent's Hospital where it will take place after the intervention has been completed, and will take between 45 minutes to 1 hour approximately.

You can withdraw from the study at any point up until the research data is submitted for examination purposes. Under the Freedom of Information Act, 2000, you have the right to access data collected from you during the course of the research.

### **ARE THERE ANY BENEFITS FROM MY PARTICIPATION?**

You may or may not benefit from your participation in either group that you are randomly assigned to. The information we will obtain from both groups may provide further knowledge of this condition and aid in the development of psychological supports for this condition.

### **ARE THERE ANY RISKS INVOLVED IN PARTICIPATING?**

There are minimal risks associated with this study. There are risks of distress from answering the questionnaires and risks from blood sampling e.g. bruising at site, fainting. Should you become distressed in the course of this research, you will have access to Dr. Paul D'Alton who is a Clinical Psychologist.

### **WHAT HAPPENS IF I DO NOT AGREE TO PARTICIPATE?**

If you decide not to participate in this study your treatment will not be affected in any way.

### **CONFIDENTIALITY**



Your identity will remain confidential. A study number will identify you. Your name will not be published or disclosed to anyone.

### **COMPENSATION**

Your doctors are adequately insured by virtue of their participation in the clinical indemnity scheme.

### **WHO IS ORGANISING AND FUNDING THIS RESEARCH?**

This study is organised and funded by Health Research Board.

### **HAS THIS STUDY BEEN REVIEWED BY AN ETHICS COMMITTEE?**

The St. Vincent's Healthcare Group, Ethics and Medical Research Committee have reviewed and approved this study.

### **CONTACT DETAILS**

Name of Researcher: Mr. Alan Maddock

CORU Registered Social Worker

Researchers Email Address: [maddocka@tcd.ie](mailto:maddocka@tcd.ie)

Researchers Telephone Number: 896 2406

Research Supervisor: Dr. David Hevey

Clinical Psychologist/Academic Supervisor

Researcher Supervisors Email Address: [heveydt@tcd.ie](mailto:heveydt@tcd.ie)

Phone: 896 2406

Research Supervisor: Dr. Paul D'Alton

Clinical Psychologist

Researcher Supervisors Email Address: [P.D'Alton@st-vincent's.ie](mailto:P.D'Alton@st-vincent's.ie)

Phone: 01 221 4000

Research Supervisor: Professor. Brian Kirby

Consultant Dermatologist

Researcher Supervisors Email Address: [B.Kirby@svuh.ie](mailto:B.Kirby@svuh.ie)

Phone: 01 2638816

**PLEASE TICK YOUR RESPONSE IN THE APPROPRIATE BOX**

- I have read and understood the Participant Information YES  NO
- I have had the opportunity to ask questions and discuss the study YES  NO
- I have received satisfactory answers to all my questions YES  NO
- I have received enough information about this study YES  NO
- I understand that I am free to withdraw from the study at any time without giving a reason and without this affecting my future medical care YES  NO
- I agree to take part in the study YES  NO

Participant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Participant's Name in print: \_\_\_\_\_

Investigator's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Investigator's Name in print: \_\_\_\_\_

## **APPENDIX 4: CHAPTER 5 INTERVIEW SCHEDULE**

### **Mindfulness and Psoriasis Study Interview Schedule**

#### **Researcher: Alan Maddock**

As you know, this study is on the effectiveness of Mindfulness Based Cognitive Therapy on the physical and psychological symptoms of psoriasis patients, and their experience of engaging in this intervention. With this in mind I would like to ask you a few questions:

- After being a part of a mindfulness intervention, can you tell me what the term 'mindfulness' means to you?
- Do you feel that being a part of this intervention helped you to become aware of how you would normally react to thoughts, emotions and body sensations?  
If yes, in what way did it do so? Were your past reactions positive or negative for you? And how would you compare your past reactions with how you feel you would react currently?
- Do you feel that being a part of this intervention, and being more mindful helped you to develop an insight into the short lived nature of thoughts, emotions and body sensations?  
If yes, in what way did it do so and what have you noticed?
- Do you feel that being a part of this intervention helped you to be more aware of how you relate to your feelings?  
If yes, how is this different from before the intervention?
- Did you notice that when you were experiencing a state of mindfulness, an attitude of acceptance and curiosity towards whatever you were experiencing occur?

If yes, how did this change how you relate to your thinking? Did you notice how your thoughts were? E.g. did you have more or less thoughts? Were thoughts when they occurred, more positive? Less negative in tone?

- Did you notice that when you were experiencing a state of mindfulness how you might have judged yourself, or others previously change? If so, what did you notice?
- Do you feel that being a part of this intervention, and being more mindful helped you to focus your attention and concentration?  
If yes, where did you focus your attention? How did this change in how you regulated your attention impact on your thoughts? Did you have more or less thoughts? Were thoughts when they occurred, more positive? Less negative in tone?
- Do you feel that being a part of this intervention, and being more mindful helped you to relate differently to how you might have thought previously?  
If yes, what do you notice are the main differences from before the intervention?
- Do you feel that being a part of this intervention, and being more mindful has reduced your Psoriasis symptoms?  
If yes, in what ways do you feel that this has been achieved? What do you think are the mechanism or factors that have allowed your Psoriasis symptoms to reduce?
- You were set weekly homework practices, of six out of seven days each week to meditate for 30 minutes approximately, and other activities such as the pleasant and unpleasant experiences questionnaire? How much of the homework did you do, and how much meditation practice did you do weekly?

- Having learned practical skills in being mindful, do you think that you will use these skills on a day-to-day basis?
- Is there anything else that we have not covered that you would like to add about the process and of your experience of being a part of the mindfulness intervention?

**APPENDIX 5 STUDY MEASURES FOR CHAPTERS 3, 4 AND 6**

**Instructions:** To help us understand your general approach to life and your views about yourself, others, and life in general, tell us the extent to which the following statements, on the following scales reflect your experiences at this point in your life. Please rate how each statement is for you by circling a number next to it.

**Please answer according to what *really reflects* your experience rather than what you think your experience should be.**

**PMS:** Select a number from **1 to 5** on the scale provided with each statement to rate how often you experienced the following statements in the **past week**.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very often

	Please select <b>how often</b> you experienced each of the following statements within the past week	Never				Very Often
1	I am aware of what thoughts are passing through my mind.	1	2	3	4	5
2	I try to distract myself when I feel unpleasant emotions.	1	2	3	4	5
3	When talking with other people, I am aware of their facial and body expressions.	1	2	3	4	5
4	There are aspects of myself I don't want to think about.	1	2	3	4	5
5	When I shower, I am aware of how the water is running over my body.	1	2	3	4	5
6	I try to stay busy to keep thoughts or feelings from coming to mind.	1	2	3	4	5
7	When I am startled, I notice what is going on inside my body.	1	2	3	4	5
8	I wish I could control my emotions more easily.	1	2	3	4	5
9	When I walk outside, I am aware of smells or how the air feels against my face.	1	2	3	4	5
10	I tell myself that I shouldn't have certain thoughts.	1	2	3	4	5
11	When someone asks how I am feeling, I can identify my emotions easily.	1	2	3	4	5
12	There are things I try not to think about.	1	2	3	4	5
13	I am aware of thoughts I'm having when my mood changes.	1	2	3	4	5

14	I tell myself that I shouldn't feel sad.	1	2	3	4	5
15	I notice changes inside my body, like my heart beating faster or my muscles getting tense.	1	2	3	4	5
16	If there is something I don't want to think about, I'll try many things to get it out of my mind.	1	2	3	4	5
17	Whenever my emotions change, I am conscious of them immediately.	1	2	3	4	5
18	I try to put my problems out of mind.	1	2	3	4	5
19	When talking with other people, I am aware of the emotions I am experiencing.	1	2	3	4	5
20	When I have a bad memory, I try to distract myself to make it go away.	1	2	3	4	5

**SMQ:** Select a number from **0 to 6** on the scale provided with each statement to rate the extent to which you agree with it.

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

	<b>Usually when I experience distressing thoughts and images....</b>	<b>Level of agreement</b>						
1	I am able just to notice them without reacting	0	1	2	3	4	5	6
2	They take over my mind for quite a while afterwards	0	1	2	3	4	5	6
3	I judge the thought/image as good or bad	0	1	2	3	4	5	6
4	I feel calm soon after	0	1	2	3	4	5	6
5	I am able to accept the experience	0	1	2	3	4	5	6
6	I get angry that this happens to me	0	1	2	3	4	5	6
7	I notice how brief the thoughts and images really are	0	1	2	3	4	5	6
8	I judge myself as good or bad, depending on what the thought/image is about	0	1	2	3	4	5	6
9	I 'step back' and am aware of the thought or image without getting taken over by it	0	1	2	3	4	5	6
10	I just notice them and let them go	0	1	2	3	4	5	6
11	I accept myself the same whatever the thought/image is about	0	1	2	3	4	5	6
12	In my mind I try and push them away	0	1	2	3	4	5	6

13	I keep thinking about the thought or image after it's gone	0	1	2	3	4	5	6
14	I find it so unpleasant I have to distract myself and not notice them	0	1	2	3	4	5	6
15	I try just to experience the thoughts or images without judging them	0	1	2	3	4	5	6
16	I lose myself in the thoughts/image	0	1	2	3	4	5	6

**EQ:** Select a **number from 1 to 5** on the scale provided with each statement to rate the extent to which you agree with it.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

		Level of agreement				
1	I am able to accept myself as I am.	1	2	3	4	5
2	I can observe unpleasant feelings without being drawn into them.	1	2	3	4	5
3	I notice that I don't take difficulties so personally.	1	2	3	4	5
4	I can treat myself kindly.	1	2	3	4	5
5	I can separate myself from my thoughts and feelings.	1	2	3	4	5
6	I have the sense that I am fully aware of what is going on around me and inside me.	1	2	3	4	5
7	I can slow my thinking at times of stress	1	2	3	4	5
8	I can actually see that I am not my thoughts.	1	2	3	4	5
9	I am consciously aware of a sense of my body as a whole.	1	2	3	4	5
10	I can take time to respond to difficulties.	1	2	3	4	5
11	I view things from a wider perspective.	1	2	3	4	5

**NAS:** Select a **number from 1 to 6** on the scale provided with each statement to rate the extent to which you agree with it.

1	2	3	4	5	6
Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly



1	I can accept the flow of events in my life without hanging onto them or pushing them away.	1	2	3	4	5	6
2	I can let go of regrets and feelings of dissatisfaction about the past.	1	2	3	4	5	6
3	I find I can be calm and/or happy even if things are not going my way.	1	2	3	4	5	6
4	I have a hard time appreciating others' successes when they outperform me.	1	2	3	4	5	6
5	I can remain open to what life offers me regardless of whether it seems desirable or undesirable at a particular time.	1	2	3	4	5	6
6	I can enjoy pleasant experiences without needing them to last forever.	1	2	3	4	5	6
7	I view the problems that enter my life as things/issues to work on rather than reasons for becoming disheartened or demoralized.	1	2	3	4	5	6
8	I can enjoy my possessions without being upset when they are damaged or destroyed.	1	2	3	4	5	6
9	The amount of money I have is not important to my sense of who I am.	1	2	3	4	5	6
10	I do not go out of my way to cover up or deny my negative qualities or mistakes.	1	2	3	4	5	6
11	I accept my flaws.	1	2	3	4	5	6
12	I can enjoy my family and friends without feeling I need to hang on to them.	1	2	3	4	5	6
13	If things aren't turning out the way I want, I get upset.	1	2	3	4	5	6
14	I can enjoy the pleasures of life without feeling sad or frustrated when they end.	1	2	3	4	5	6
15	I can take joy in others' achievements without feeling envious.	1	2	3	4	5	6
16	I find I can be happy almost regardless of what is going on in my life.	1	2	3	4	5	6
17	Instead of avoiding or denying life's difficulties, I face up to them.	1	2	3	4	5	6
18	I am open to reflecting on my past mistakes and failings.	1	2	3	4	5	6
19	I do not get "hung up" on wanting an "ideal" or "perfect" life.	1	2	3	4	5	6
20	I am comfortable being an ordinary, less than perfect human being.	1	2	3	4	5	6
21	I can remain open to thoughts and feelings that come into my mind, even if they are negative or painful.	1	2	3	4	5	6
22	I can see my own problems and shortcomings without trying to blame them on someone or something outside myself.	1	2	3	4	5	6
23	When pleasant experiences end, I am fine moving on to what comes next.	1	2	3	4	5	6
24	I am often preoccupied by threats or fears.	1	2	3	4	5	6
25	I am not possessive of the people I love.	1	2	3	4	5	6
26	I do not have to hang on to the people I love at all costs; I can let them go if they wish to go.	1	2	3	4	5	6
27	I do not feel I need to escape or avoid bad experiences in my life.	1	2	3	4	5	6
28	I can admit my shortcomings without shame or embarrassment.	1	2	3	4	5	6
29	I experience and acknowledge grief following significant losses, but do not become overwhelmed, devastated, or incapable of meeting life's other demands.	1	2	3	4	5	6
30	I am not possessive of the things I own.	1	2	3	4	5	6

**AAQ:** Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
Never True	Very seldom true	Seldom true	Sometimes true	Frequently true	Almost always true	Always true

1	My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
2	I'm afraid of my feelings.	1	2	3	4	5	6	7
3	I worry about not being able to control my worries and feelings	1	2	3	4	5	6	7
4	My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
5	Emotions cause problems in my life.	1	2	3	4	5	6	7
6	It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
7	Worries get in the way of my success.	1	2	3	4	5	6	7

**RRQ:** For each of the following statements, rate you level of agreement using the following scale:

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

1	My attention is often focused on aspects of myself I wish I'd stop thinking about.	1	2	3	4	5
2	I always seem to be rehashing in my mind recent things I've said or done.	1	2	3	4	5
3	Sometimes it is hard for me to shut off thoughts about myself.	1	2	3	4	5
4	Long after an argument or disagreement is over with, my thoughts keep going back to what happened.	1	2	3	4	5
5	I tend to "ruminate" or dwell over things that happen to me for a really long time afterward.	1	2	3	4	5
6	I don't waste time rethinking things that are over and done with.	1	2	3	4	5
7	Often I'm playing back over in my mind how I acted in a past situation.	1	2	3	4	5
8	I often find myself reevaluating something I've done.	1	2	3	4	5
9	I never ruminate or dwell on myself for very long.	1	2	3	4	5
10	It is easy for me to put unwanted thoughts out of my mind.	1	2	3	4	5
11	I often reflect on episodes in my life that I should no longer concern myself with.	1	2	3	4	5
12	I spend a great deal of time thinking back over my embarrassing or disappointing moments.	1	2	3	4	5
13	Philosophical or abstract thinking doesn't appeal to me that much.	1	2	3	4	5
14	I'm not really a meditative type of person.	1	2	3	4	5

15	I love exploring my “inner” self.	1	2	3	4	5
16	My attitudes and feelings about things fascinate me.	1	2	3	4	5
17	I don’t really care for introspective or self-reflective thinking.	1	2	3	4	5
18	I love analyzing why I do things.	1	2	3	4	5
19	People often say I’m a “deep,” introspective type of person.	1	2	3	4	5
20	I don’t care much for self-analysis.	1	2	3	4	5
21	I’m very self-inquisitive by nature.	1	2	3	4	5
22	I love to meditate on the nature and meaning of things.	1	2	3	4	5
23	I often love to look at my life in philosophical ways.	1	2	3	4	5
24	Contemplating myself isn’t my idea of fun.	1	2	3	4	5

**PWBS**

Please indicate your degree of agreement (using a score ranging from 1-6) to the following sentences.

**Strongly Agree**

**Strongly Disagree**

**1**

**2**

**3**

**4**

**5**

**6**

<b>1</b>	I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.	1	2	3	4	5	6
<b>2</b>	In general, I feel I am in charge of the situation in which I live.	1	2	3	4	5	6
<b>3</b>	I am not interested in activities that will expand my horizons.	1	2	3	4	5	6
<b>4</b>	Most people see me as loving and affectionate.	1	2	3	4	5	6
<b>5</b>	I live life one day at a time and don't really think about the future.	1	2	3	4	5	6
<b>6</b>	When I look at the story of my life, I am pleased with how things have turned out.	1	2	3	4	5	6
<b>7</b>	My decisions are not usually influenced by what everyone else is doing.	1	2	3	4	5	6
<b>8</b>	The demands of everyday life often get me down.	1	2	3	4	5	6
<b>9</b>	I think it is important to have new experiences that challenge how you think about yourself and the world.	1	2	3	4	5	6
<b>10</b>	Maintaining close relationships has been difficult and frustrating for me.	1	2	3	4	5	6
<b>11</b>	I have a sense of direction and purpose in life.	1	2	3	4	5	6
<b>12</b>	In general, I feel confident and positive about myself.	1	2	3	4	5	6
<b>13</b>	I tend to worry about what other people think of me.	1	2	3	4	5	6
<b>14</b>	I do not fit very well with the people and the community around me.	1	2	3	4	5	6
<b>15</b>	When I think about it, I haven't really improved much as a person over the years.	1	2	3	4	5	6
<b>16</b>	I often feel lonely because I have few close friends with whom to share my concerns.	1	2	3	4	5	6
<b>17</b>	My daily activities often seem trivial and unimportant to me.	1	2	3	4	5	6
<b>18</b>	I feel like many of the people I know have gotten more out of life than I have.	1	2	3	4	5	6

19	I tend to be influenced by people with strong opinions.	1	2	3	4	5	6
20	I am quite good at managing the many responsibilities of my daily life.	1	2	3	4	5	6
21	I have the sense that I have developed a lot as a person over time.	1	2	3	4	5	6
22	I enjoy personal and mutual conversations with family members or friends.	1	2	3	4	5	6
23	I don't have a good sense of what it is I'm trying to accomplish in life.	1	2	3	4	5	6
24	I like most aspects of my personality.	1	2	3	4	5	6
25	I have confidence in my opinions, even if they are contrary to the general consensus.	1	2	3	4	5	6
26	I often feel overwhelmed by my responsibilities	1	2	3	4	5	6
27	I do not enjoy being in new situations that require me to change my old familiar ways of doing things.	1	2	3	4	5	6
28	People would describe me as a giving person, willing to share my time with others.	1	2	3	4	5	6
29	I enjoy making plans for the future and working to make them a reality.	1	2	3	4	5	6
30	In many ways, I feel disappointed about my achievements in life.	1	2	3	4	5	6
31	It's difficult for me to voice my own opinions on controversial matters.	1	2	3	4	5	6
32	I have difficulty arranging my life in a way that is satisfying to me.	1	2	3	4	5	6
33	For me, life has been a continuous process of learning, changing, and growth.	1	2	3	4	5	6
34	I have not experienced many warm and trusting relationships with others.	1	2	3	4	5	6
35	Some people wander aimlessly through life, but I am not one of them	1	2	3	4	5	6
36	My attitude about myself is probably not as positive as most people feel about themselves.	1	2	3	4	5	6
37	I judge myself by what I think is important, not by the values of what others think is important.	1	2	3	4	5	6
38	I have been able to build a home and a lifestyle for myself that is much to my liking.	1	2	3	4	5	6
39	I gave up trying to make big improvements or changes in my life a long time ago.	1	2	3	4	5	6
40	I know that I can trust my friends, and they know they can trust me.	1	2	3	4	5	6
41	I sometimes feel as if I've done all there is to do in life.	1	2	3	4	5	6
42	When I compare myself to friends and acquaintances, it makes me feel good about who I am.	1	2	3	4	5	6

## PSWQ

Instructions: Rate each of the following statements on a scale of 1 (“not at all typical of me”) to 5 (“very typical of me”). Please do not leave any items blank.

		Not Typical			Very Typical	
1	If I do not have enough time to do everything, I do not worry about it.	1	2	3	4	5
2	My worries overwhelm me.	1	2	3	4	5
3	I do not tend to worry about things.	1	2	3	4	5
4	Many situations make me worry.	1	2	3	4	5
5	I know I should not worry about things, but I just cannot help it.	1	2	3	4	5
6	When I am under pressure I worry a lot.	1	2	3	4	5
7	I am always worrying about something	1	2	3	4	5
8	I find it easy to dismiss worrisome thoughts.	1	2	3	4	5
9	As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10	I never worry about anything.	1	2	3	4	5
11	When there is nothing more I can do about a concern, I do not worry about it any more.	1	2	3	4	5
12	I have been a worrier all my life.	1	2	3	4	5
13	I notice that I have been worrying about things	1	2	3	4	5
14	Once I start worrying, I cannot stop.	1	2	3	4	5
15	I worry all the time.	1	2	3	4	5
16	I worry about projects until they are all done.	1	2	3	4	5

**HADS:** This questionnaire is designed to help us know how you feel. Read each item and **circle the number** opposite the reply which comes closest to how you have been feeling in the past week.

Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

**1) I feel tense or 'wound up':**

Most of the time.....3  
A lot of the time .....2  
From time to time, occasionally .....1  
Not at all .....0

**2) I feel as if I am slowed down:**

Nearly all the time.....3  
Very often.....2  
Sometimes .....1  
Not at all .....0

**3) I still enjoy the things I used to enjoy:  
appearance:**

Definitely as much.....0  
Not quite so much.....1  
Only a little.....2  
Hardly at all.....3

**5) I get a sort of frightened feeling like**

**'butterflies' in the stomach**

Not at all.....0  
Occasionally.....1  
Quite Often.....2  
Very often.....3

**7) I can laugh and see the funny side of things:  
the move:**

As much as I always could.....0  
Not quite so much now.....1  
Definitely not so much now.....2  
Not at all.....3

**9) Worrying thoughts go through my mind:  
to things**

A great deal of the time.....3  
A lot of the time.....2  
From time to time, but not too often...1  
Only occasionally .....0

**11) I feel cheerful:**

Not at all.....3  
Not often.....2  
Sometimes .....1  
Most of the time.....0

**13) I can sit at ease and feel relaxed:  
or TV programme:**

Definitely .....0  
Usually..... 1  
Not often..... 2  
Not at all.....3

**4) I have lost interest in my**

Definitely.....3  
I don't care as much as I should.....2  
I may not take quite as much care...1  
I take just as much care as ever....0

**6) I get a sort of frightened feeling  
as if something awful is about to happen**

Very definitely and quite badly.....3  
Yes, but not too badly.....2  
A little, but it doesn't worry me ....1  
Not at all.....0

**8) I feel restless as I have to be on**

Very much indeed.....3  
Quite a lot.....2  
Not very much.....1  
Not at all.....0

**10) I look forward with enjoyment**

As much as I ever did.....0  
Rather less than I used to.....1  
Definitely less than I used to.....2  
Hardly at all .....3

**12) I get sudden feelings of panic:**

Very often indeed .....3  
Quite often.....2  
Not very often.....1  
Not at all .....0

**14) I can enjoy a good book, radio**

Often.....0  
Sometimes.....1  
Not often..... 2  
Very seldom.....3

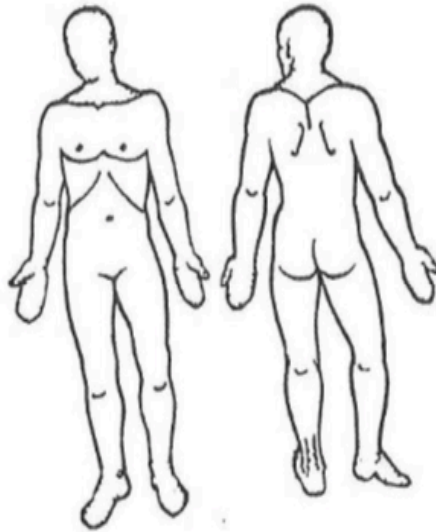
**SCS: HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES**

Rate each of the following statements on a scale of 1 (“Almost Never”) to 5 (“Almost Always”). Please do not leave any items blank.

		<b>Almost Never</b>			<b>Almost Always</b>	
<b>1</b>	I’m disapproving and judgmental about my own flaws and inadequacies.	1	2	3	4	5
<b>2</b>	When I’m feeling down I tend to obsess and fixate on everything that’s wrong.	1	2	3	4	5
<b>3</b>	When things are going badly for me, I see the difficulties as part of life that everyone goes through.	1	2	3	4	5
<b>4</b>	When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.	1	2	3	4	5
<b>5</b>	I try to be loving towards myself when I’m feeling emotional pain.	1	2	3	4	5
<b>6</b>	When I fail at something important to me I become consumed by feelings of inadequacy.	1	2	3	4	5
<b>7</b>	When I’m down and out, I remind myself that there are lots of other people in the world feeling like I am.	1	2	3	4	5
<b>8</b>	When times are really difficult, I tend to be tough on myself.	1	2	3	4	5
<b>9</b>	When something upsets me I try to keep my emotions in balance.	1	2	3	4	5
<b>10</b>	When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	1	2	3	4	5
<b>11</b>	I’m intolerant and impatient towards those aspects of my personality I don't like.	1	2	3	4	5
<b>12</b>	When I’m going through a very hard time, I give myself the caring and tenderness I need.	1	2	3	4	5
<b>13</b>	When I’m feeling down, I tend to feel like most other people are probably happier than I am.	1	2	3	4	5
<b>14</b>	When something painful happens I try to take a balanced view of the situation.	1	2	3	4	5
<b>15</b>	I try to see my failings as part of the human condition.	1	2	3	4	5
<b>16</b>	When I see aspects of myself that I don’t like, I get down on myself.	1	2	3	4	5
<b>17</b>	When I fail at something important to me I try to keep things in perspective.	1	2	3	4	5
<b>18</b>	When I’m really struggling, I tend to feel like other people must be having an easier time of it.	1	2	3	4	5
<b>19</b>	I’m kind to myself when I’m experiencing suffering.	1	2	3	4	5
<b>20</b>	When something upsets me I get carried away with my feelings.	1	2	3	4	5
<b>21</b>	I can be a bit cold-hearted towards myself when I’m experiencing suffering.	1	2	3	4	5

<b>22</b>	When I'm feeling down I try to approach my feelings with curiosity and openness.	1	2	3	4	5
<b>23</b>	I'm tolerant of my own flaws and inadequacies.	1	2	3	4	5
<b>24</b>	When something painful happens I tend to blow the incident out of proportion.	1	2	3	4	5
<b>25</b>	When I fail at something that's important to me, I tend to feel alone in my failure.	1	2	3	4	5
<b>26</b>	I try to be understanding and patient towards those aspects of my personality I don't like.	1	2	3	4	5



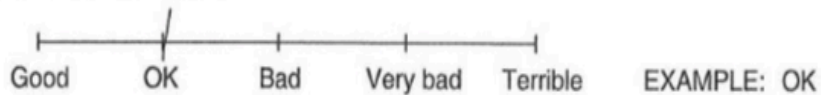


**How bad is your psoriasis TODAY?**

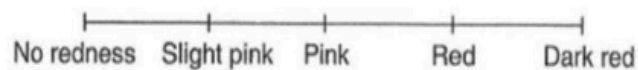
*We need to know where you have psoriasis and how red, thick, and scaly it is to tell how bad your psoriasis is.*

1. As best you can, please shade in on the drawing exactly where you have psoriasis.
2. Answer each question by placing a mark anywhere on the line to show how red, thick and scaly an average spot of your psoriasis is (see example).

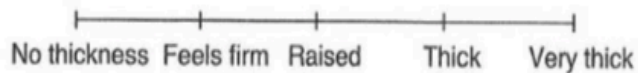
Example: How do you feel today?



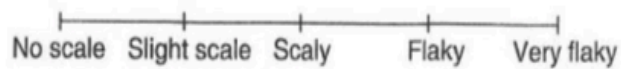
A. What color is an average spot of your psoriasis?



B. How thick is an average spot of your psoriasis?



C. How scaly is an average spot of your psoriasis?



## Week 2

### Mindfulness Based Cognitive Therapy

St. Vincent's University Hospital  
Elm Park  
Dublin 4

#### Summary of Session 2: Dealing with Barriers

Our aim in this program is to be more aware, more often. A powerful influence taking us away from being “fully present” in each moment is our automatic tendency to judge our experience as being not quite right in some way – that is not what should be happening, not good enough, or not what we expected or wanted. These judgements can lead to sequences of thoughts about blame, what needs to be changed, or how things could or should be different. Often, these thoughts will take us, quite automatically, down some fairly well-worn paths in our minds. In this way we may lose awareness of the moment and also the freedom to *choose* what, if any, action needs to be taken.

We can regain our freedom if, as a first step, we simply acknowledge the actuality of our situation, without immediately being hooked into automatic tendencies to judge, fix, or want things to be other than they are. The body scan exercise provides an opportunity to practice simply bringing an interested and friendly awareness to the way things are in each moment, without having to do anything to change things. There is no goal to be achieved other than to bring awareness to bear as the instructions suggest – specifically, achieving some special state of relaxation is *not* a goal of the exercise.

#### The Breath

Breath is life. You could think of the breath as being like a thread or a chain that links and connects all the events of your life from birth, the beginning, to death, the end. The breath is always there every moment, moving by itself like a river.

Have you ever noticed how the breath changes with our moods - short and shallow when we're tense or angry, faster when we're excited, slow and full when we're happy, and almost disappearing when we're afraid? It's there with us all the time. It can be used as a tool, like an anchor, to bring stability to the body and mind when we deliberately choose to become aware of it. We can tune into it at any moment during everyday life.

Mostly, we're not in touch with our breathing – it's just there, forgotten. So one of the first things we do in mindfulness-based Cognitive Therapy is to get in touch with it. We notice how the breath changes with our moods, our thoughts, our body movements. We don't have to control the breath. Just notice it and get to know it, like a friend. All that is necessary is to observe, watch, and feel the breath with a sense of interest, in a relaxed manner.

With practice, we become more aware of our breathing. We can use it to direct our awareness to different aspects of our lives. For example, to relax tense muscles, or focus on a situation that requires attention. Breath can also be used to help deal with pain, anger, relationships or the stress of daily life. During this program, we will be exploring this in great detail.

## **Mindfulness of the Breath**

1. Settle into a comfortable sitting position, either on a straight – backed chair or on a soft surface on the floor, with your buttocks supported by cushions or a low stool. If you use a chair, it is very helpful to sit away from the back of the chair, so that your spine is self supporting. If you sit on the floor, it is helpful if your knees actually touch the floor; experiment with the height of the cushions or stool until you feel comfortably and firmly supported.
2. Allow your back to adopt an erect, dignified and comfortable posture. If sitting on a chair, place your feet flat on the floor, with your legs uncrossed. Gently close your eyes.
3. Bring your awareness to the level of physical sensations by focusing your attention on the sensations of touch and pressure in your in your body where it makes contact with the floor and whatever you are sitting on. Spend a minute or two exploring these sensations, just as in the body scan.
4. Now bring your awareness to the changing patterns of physical sensations in the lower abdomen as the breath moves on and out of the body. (When you first try this practice, it may be helpful to place your hand on your lower abdomen and become aware of the changing pattern of sensations where your hand makes contact with your abdomen. Having

“tuned in” to the physical sensations in this area in this way, you can remove your hand and continue to focus on the sensations in the abdominal wall.)

5. Focus your awareness on the sensations of slight stretching as the abdominal wall rises with each inbreath, and of gentle deflation as it falls with each outbreath. As best you can, follow with your awareness the changing physical sensations in the lower abdomen all the way through as the breath enters your body on the inbreath and all the way through as the breath leaves your body on the outbreath perhaps noticing the slight pauses between one inbreath and the following outbreath, and between one outbreath and the following inbreath.
6. There is no need to try to control the breathing in any way – simply let the breath breathe itself. As best you can, also bring this attitude of allowing to the rest of your experience. There is nothing to be fixed, no particular state to be achieved. As best you can, simply allow your experience to be your experience, without needing it to be other than it is.
7. Sooner or later (usually sooner), your mind will wander away from the focus on the breath in the lower abdomen to the thoughts, planning, daydreams, drifting along – whatever. This is perfectly OK – it’s simply what minds do. It is not a mistake or a failure. When you notice that your awareness is no longer on the breath, gently congratulate yourself – you have come back and are once more aware of your experience! You may want to acknowledge briefly where the mind has been (“Ah, there’s thinking”). Then, gently escort the awareness back to a focus on the changing pattern of physical sensations in the lower abdomen, renewing the intention to pay attention to the ongoing inbreath or outbreath, whichever you find.
8. However often you notice that the mind has wandered (and this will quite likely happen over and over and over again), as best you can, congratulate yourself each time on reconnecting with your experience in the moment, gently escorting the attention back to the breath, and simply resume following in awareness the changing pattern of physical sensations that come with each inbreath and outbreath.
9. As best you can, bring a quality of kindness to your awareness, perhaps seeing the repeated wanderings of the mind as opportunities to bring patience and gentle curiosity to your experience.
10. Continue with the practice for 15 minutes, or longer if you wish, perhaps reminding yourself from time to time that the intention is simply to be aware of your experience in each moment, as best you can, using the

breath as an anchor to gently reconnect with the here and now each time you notice that your mind has wandered and is no longer down in the abdomen, following the breath.

### **Tips for the Body Scan**

1. Regardless of what happens (e.g. if you fall asleep, lose concentration, keep thinking of other things or focusing on the wrong bit of body or not feeling anything), persist with it! These are just your experiences in the moment. See if it is possible to be aware of them all, just as they are.
2. If your mind is wandering a lot, simply note the thoughts (as passing events), then bring the mind back gently to the body scan
3. Let go of ideas of “success” and “failure”, “doing it well” or “trying to purify the body”. This is not a competition. It is not a skill for which you need to strive. The only discipline involved is regular and frequent practice. Just do it with an attitude of openness and curiosity, then allow the rest to take care of itself.
4. Let go of any expectations about what the body scan will do for you: imagine it as a seed you have planted. The more you poke around and interfere, the less it will be able to develop. So with the body scan, just give it the right conditions – peace and quiet, regular and frequent practice. That is all. The more you try to influence what it will do for you, the less it will do.
5. Try approaching your experience in each moment with the attitude “OK, that’s just the way things are right now”. If you try to fight off unpleasant thoughts, feelings or body sensations, the upsetting feelings will only distract you for doing anything else. Be aware, be nonstriving, be in the moment, accept things as they are.

## Homework for Week 2

1. Do the body scan for 6 days and record your reactions on the Home Practice Record Form
2. At different times, practice 10 minutes of mindfulness of breathing for 6 out of 7 days. Being with your breath in this way each day provides an opportunity to become aware of what it feels like to be connect and present in the moment without having to *do* anything
3. Complete the Pleasant Experiences Calendar (one entry per day). Use this as an opportunity to become really aware of the thoughts, feelings and body sensations around one pleasant even each day. Notice and records, as soon as you can, *in detail*, (e.g. use the actual words or images in which the thoughts came, the precise nature and location of body sensations)
4. Chose a new routine activity to be especially mindful of (e.g. brushing your teeth, washing dishes, taking a shower, taking out the garbage, reading to kids, shopping, eating)

## Pleasant Events Calendar

Name: \_\_\_\_\_

Be aware of the pleasant event at the time it is happening. Use the following questions to focus your awareness on the details of the experience as it is happening. Write it down later.

What was the experience?	Were you aware of the pleasant feelings while the event was happening?	How did your body feel, in detail, during this experience?	What mood, feelings and thoughts accompanied this event?	What thoughts are in your mind now as you write this down?
<i>Example: Heading home at the end of my shift – stopping, hearing a bird sing</i>	<i>Yes</i>	<i>Lightness across the face, aware of shoulders, drooping, uplift of corners of mouth</i>	<i>Relief, pleasure. "That's good". "How lovely (the bird)". "It's so nice to be outside".</i>	<i>It was such a small thing but I'm glad I noticed it.</i>
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

### Homework Record Form

Name: \_\_\_\_\_

Record on the Homework Record Form each time you practice. Also, make a note of anything that comes up in the homework, so that we can talk about it at the next meeting.

Day/Date	Practice (Yes/No)	Comments
Day One: Date:		
Day Two: Date:		
Day Three: Date:		
Day Four: Date:		
Day Five: Date:		
Day Six: Date:		
Day Seven: Date:		